



FRIDAY, DECEMBER 24.

Railroad Crossing-Signal.

This form of signal is used on the Pittsburgh, Cincinnati & St. Louis Railway for crossings at an angle of 90°. It will be seen that it has a long arm attached to a vertical shaft. When one of the roads is intended to be clear, the arm is swung across the other. The top of the shaft has targets, which revolve with it. One of these targets shows red on the line which is blocked, and white to that one

perience, men will interpose their personal likes and dislikes, and by the exercise of their ingenuity for a few hours or days, will attempt to supersede what has been tested under the most diversified circumstances, and by all kinds of people. The consequence is that in Ohio and other states mongrel types of semaphores are used, of which each kind has a different significance. There are, of course, under these circumstances, great objections to them, but the evil is due to their defects and diversities, which do not exist if they are made as they should be.

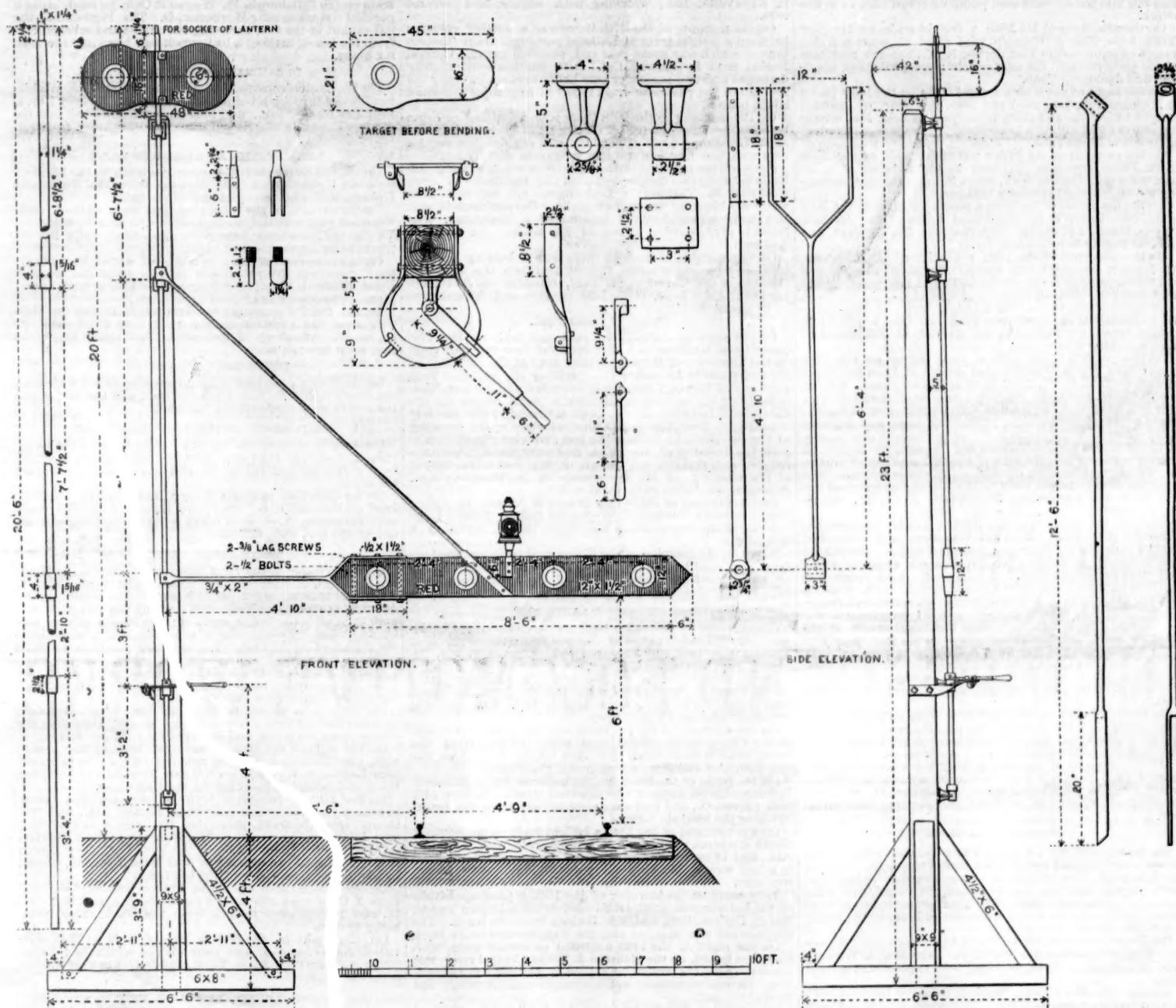
One great merit, if not the chief, of the signal illustrated is that the arm which extends across the track is in reality a great semaphore arm, which will attract immediate attention. The target is placed on top of the shaft, so as to be more conspicuous. The criticism which we would make is that the form of the danger and safety targets is too nearly

On the afternoon of the 4th an express train on the Eastern Railroad ran into a local passenger train which was switching across the main track in Lynn, Mass. The engine was damaged, several cars broken and a man on the local train killed. The local train had landed all its passengers, and the cars fortunately were empty. The man who was killed stood on a platform.

On the morning of the 5th a passenger train on the New York, Lake Erie & Western road ran over a misplaced switch and into the rear of a freight train standing on a siding at Penn Horn, N. J. The passenger engine was badly damaged and the freight caboose wrecked. The passenger engineer and a train-man in the caboose were killed, a passenger and a fireman hurt. The switch-tender ran away.

On the evening of the 5th a freight train on the Boston, Hoosac Tunnel & Western road ran into the rear of a preceding freight at Reynolds, N. Y., wrecking several cars and killing a brakeman. The road was blocked all night.

On the night of the 5th a freight train on the Troy &



RAILROAD CROSSING SIGNAL, PITTSBURGH, CINCINNATI & ST. LOUIS RAILWAY.

which is clear. Otherwise the construction of this signal is made very clear by the engravings.

In the state of Ohio a species of semaphore crossing-signal is very largely used—in fact it may be said exclusively used, except on the above line—which indicates to the engineer the condition of the road by the position of the board in the day time and by the lights at night. In some cases men are obliged to run over roads on which at one part of the line one position of these semaphores indicates safety, and at another part the same position means danger, and still a different position of the arm signifies safety.

In the construction of semaphores, the propensity of some railroad officers to dissent from everything other people have done is sometimes very marked. Probably, if these same people undertook to learn to play the violin, they would at once proceed to improve that instrument. It would be rash to say that this would be impossible, but there is somewhat the same chance of improving the well-known form of semaphore that there is of inventing a new fiddle. Both these instruments have been tested by the most extended practice, and only the most weighty considerations should warrant a change. On English roads, for a quarter of a century, the simple semaphore arm has been used, and has now nearly displaced all other daylight signals. Against this extended ex-

perience, if the danger target was a semaphore and like that illustrated in the *Railroad Gazette* last week, and painted red, and the one indicating safety within a circular disk painted white, or the same as the one in the engraving, except that its greatest length should be vertical instead of horizontal, then the difference in their form and position would be much more striking and their meaning would be indicated at a glance, either by their form or color.

Train Accidents in November.

The following accidents are included in our record for November:

REAR COLLISIONS.

On the 1st a special passenger train on the Louisville & Nashville road ran into the rear of a freight train near Lynnville, Ky., doing some damage and blocking the road for a time.

On the morning of the 3rd a freight train on the Carolina Central road ran into the rear of a preceding freight near Rockingham, N. C., damaging an engine and several cars.

On the 3d a Lake Shore & Michigan Southern freight train ran into the rear of a Lake Erie & Western freight in the yard at Fremont, O., wrecking several cars.

On the night of the 3d a freight train on the New York Central & Hudson River road ran into two helping engines which were standing on the track at the foot of the grade near Byron, N. Y. The three engines and several cars were wrecked and one car caught fire and was burned up.

Boston road ran into the rear of a preceding freight near Blackinton, Mass., wrecking the caboose.

On the night of the 5th a passenger train on the Pennsylvania Railroad ran into the rear of a freight train which was just running out of the yard at the Fish House, near East Newark, N. J. The passenger engine and several freight cars were badly broken and one passenger slightly hurt.

On the morning of the 6th a freight train on the Chicago & Northwestern road ran into a preceding freight near Winetka, Ill., wrecking three cars and injuring two brakemen.

On the 6th a freight train on the Detroit & Bay City road broke in two near Orion, Mich., and the rear section afterwards ran into the forward one, wrecking four cars.

On the night of the 8th a freight train on the Seaboard & Roanoke road ran into a preceding freight near Weldon, N. C., wrecking three cars and damaging a locomotive.

On the morning of the 8th a freight train on the New York Central & Hudson River road ran into the rear of a preceding freight near Oriskany, N. Y. The engine and several cars were badly broken and a fireman hurt.

On the morning of the 10th a freight train on the Rome road ran into a preceding freight which had stalled on a grade near Kingston, Ga., wrecking one car.

On the 11th a wrecking train on the Southern Pacific road ran into a freight train standing on the track in Los Angeles, Cal., damaging the engine.

On the afternoon of the 13th a pay train on the Woonsocket Division of the New York & New England road ran into the rear of a freight train near Chestnut Hill, Mass., wrecking several cars.

About midnight on the 14th a freight train on the Lake

Shore & Michigan Southern road ran into the rear of another freight, which was standing on the track at Coits, O. Several cars were damaged and the conductor badly hurt.

On the 16th a freight train on the Kansas City, Ft. Scott & Gulf Road, ran into the rear of a preceding freight near La Cygne, Kan., wrecking several cars and injuring the fireman.

On the afternoon of the 17th a passenger train on the New Jersey & New York road ran over a misplaced switch and into a lot of coal cars standing on a siding at Carlstadt, N. J. The engine was damaged and several cars wrecked.

On the morning of the 18th a freight train on the Cleveland, Columbus, Cincinnati & Indianapolis road ran into a preceding freight near New London, O., wrecking several cars and blocking the road four hours.

On the morning of the 18th a freight train on the Lake Shore & Michigan Southern road ran into a preceding freight which had stopped near Englewood, Ill., wrecking several cars, killing the conductor and fatally injuring a brakeman.

On the 20th a freight train on the Albany & Susquehanna road broke in two near Kenwood, N. Y., and the rear section ran into the forward one, piling up seven cars in a bad wreck.

On the afternoon of the 20th a freight train on the New York, Lake Erie & Western road tried to make a flying switch of some cars in Port Jervis, N. Y., but the rear cars of the train ran into the cars which were switching, upsetting and damaging them.

On the night of the 20th a freight train on the Lake Shore & Michigan Southern road ran into the rear of another freight which was switching in the yard at Erie, Pa., wrecking one car and killing a brakeman. There was a blinding snow storm at the time.

On the morning of the 24th a passenger train on the New York, Pennsylvania & Ohio road ran into the rear of a repair train near Hubbard, O., wrecking several cars, damaging the engine and injuring a brakeman.

On the afternoon of the 24th a passenger train on the New York, New Haven & Hartford road broke in two in New Haven, Conn., and the rear cars ran into the forward section, damaging two cars slightly.

On the afternoon of the 25th a Cincinnati, Indianapolis, St. Louis & Chicago engine started off without warning and ran up the yard in Indianapolis, Ind., and into some freight cars, wrecking three of them.

On the morning of the 25th a freight train on the Louisville, Cincinnati & Lexington road ran into a preceding freight, which was just going into a siding at Independence, Ky., wrecking several cars.

On the morning of the 27th a yard engine on the New York, Lake Erie & Western road started off from the depot in East Buffalo, N. Y., from some unknown cause, with no one on board, and after running a mile or so, it ran into the rear of a work train which was distributing ties along the road, wrecking several cars, killing one man and injuring three others.

On the 27th a freight train on the Chicago, Burlington & Quincy road ran into the rear of a passenger train at Galva, Ill., damaging a sleeping car and injuring the porter.

On the 27th a freight train on the Illinois Central road ran into the rear of a preceding freight near Anna, Ill., wrecking the caboose.

Early on the morning of the 29th a freight train on the Central Railroad of Georgia ran into some cars which had broken loose from a preceding passenger train. The engine was damaged, a sleeping car wrecked, the engineer killed and three passengers hurt.

A few minutes afterwards a second freight train came up and ran into the first, as it was stopped on account of the accident. By this second collision several cars were badly broken and a brakeman hurt. It is said that the first freight train had sent back no signal.

On the morning of the 29th a freight on the Michigan Central road ran into a preceding freight which had stopped in Adrian, Mich., without sending back a flag. The locomotive was damaged, 12 cars badly broken and the fireman hurt.

On the evening of the 29th a freight train on the St. Paul, Minneapolis & Manitoba road ran into the rear of a freight engine which was standing on the track in St. Cloud, Minn. The engine was damaged and one man hurt.

On the morning of the 30th a freight train on the Baltimore & Ohio road ran into the rear of a preceding freight which was just going into a siding at Glencoe, O., wrecking several cars, injuring an engineer, and blocking the road all day.

BUTTING COLLISIONS.

On the night of the 1st there was a butting collision between a north-bound and a south-bound passenger train on the Louisville, New Albany & Chicago road at Salem, Ind. Both engines and one car were badly wrecked, five train men and a passenger hurt. The trains expected to meet at Salem, and the north-bound train was running to the siding when the collision took place.

On the afternoon of the 3d there was a collision between two freight trains on the New York, Lake Erie & Western road at Lancaster, N. Y., wrecking both engines and several cars.

On the 4th there was a butting collision between two freight trains on the Marietta & Cincinnati road near Moonville, O., by which both engines were wrecked, an engineer and firemen killed, and six other train-men hurt. It is said that the train-dispatcher neglected to notify one train of orders given the other.

On the 5th some cars broke loose from a freight train on the Cincinnati, Wabash & Michigan road near Anderson, Ind., and ran back down a grade and into the head of a following freight, damaging the engine and one car.

On the afternoon of the 6th there was a butting collision between a freight and a repair train on the Chicago, Milwaukee & St. Paul road near Grainland, Minn. Both engines were wrecked, an engineer and a fireman killed and the other engineer fatally hurt.

On the evening of the 6th a freight train on the Troy & Boston road was divided, the engine being unable to get it over the grade at Blackinton, Mass. In some way the detached cars got started and ran back down the grade some two miles, and into the head of a following freight, damaging the engine and wrecking several cars.

On the night of the 6th there was a butting collision between a passenger and a freight train on the Grand Trunk road near Caledonia, Ont., by which both engines were wrecked and several cars damaged.

On the morning of the 7th there was a butting collision between a freight train and a wild engine on the Troy & Boston road near Eagle Bridge, N. Y. Both engines were wrecked, several cars badly broken, one engineer hurt, and the road blocked all day. The dispatcher, it is said, neglected to give necessary orders.

On the morning of the 14th the engineer of a freight train on the Pittsburgh, Ft. Wayne & Chicago road being unable to make time, cut loose and ran on his engine to Valparaiso, in order to warn other trains. Meantime another train had come up and commenced to push the abandoned train forward, and when the engineer returned, expecting to find the train where he had left it, his engine ran into it with great

force, wrecking several cars. The engineer himself and the fireman were badly hurt.

On the 15th there was a butting collision between two freight trains on Morgan's Louisiana & Texas road near Vermillionville, La., by which both engines and several cars were damaged and three train-men killed.

On the evening of the 19th there was a butting collision between a freight train and a yard engine on the New Brunswick & Canada road in St. Stephen, N. B. Both engines were badly damaged.

On the morning of the 23rd there was a butting collision between a freight train and a wild engine on the New York and New England road near Andover, Conn., on a curve known as Walnut Tree Bend. Both engines were wrecked and nine cars completely broken up, making a very bad wreck, and blocking the road nearly all day. A fireman and a brakeman were badly hurt. The engineer of the wild engine had orders to meet a passenger and a freight train at Andover, but started out as soon as the passenger train had passed, without waiting for the freight.

On the 25th there was a butting collision between a freight train and a yard engine on the Lake Erie & Western road in LaFayette, Ind., wrecking both engines and several cars.

On the morning of the 27th there was a butting collision between a freight train and a local passenger train (the engine of which was at the rear end, pushing) on the Central Pacific road in Oakland, Cal. Both engines were slightly damaged and two passenger cars badly broken, but only the fireman of the passenger train received any injury beyond slight bruises.

On the morning of the 29th there was a butting collision between two freight trains on the Pittsburgh, Cincinnati & St. Louis road near Collier, O. Both engines and several cars were badly broken and four train-men slightly hurt.

Early on the morning of the 30th there was a butting collision between two freight trains on the Baltimore & Ohio road near Mt. Vernon, O. Both engines and ten cars were wrecked, blocking the road all night. The accident is said to have been caused by the blunder of a dispatcher, who failed to give an order to one of the trains. An engineer was hurt.

On the morning of the 30th there was a butting collision between a passenger and a freight train on the Northern Division of the Chicago, St. Paul, Minneapolis & Omaha road near Echo Lake, Wis. Both engines and several cars were wrecked.

CROSSING COLLISIONS.

On the morning of the 10th a passenger train on the Cincinnati and Muskingum Valley road ran into the pay train on the Columbus & Hocking Valley road at the crossing of the two roads in Lancaster, O., striking the engine. Both engines and two cars were badly wrecked and six men hurt.

Early on the morning of the 13th, a yard engine on the Cincinnati, Indianapolis, St. Louis & Chicago road ran into a Louisville, New Albany & Chicago freight at the crossing of the two roads in LaFayette, Ind., wrecking three cars.

On the morning of the 19th a Louisville & Nashville freight train ran into a Paducah & Elizabethtown freight at the crossing of the two roads in Nortonville, Ky., damaging an engine and several cars.

On the evening of the 20th a Boston & Albany passenger train ran into a Norwich & Worcester freight train at the crossing of the two roads in Worcester, Mass., wrecking a freight car.

Early on the morning of the 27th a coal train on the Buffalo Creek road backed into a Lake Shore & Michigan Southern passenger train at the crossing of the two roads in Buffalo, N. Y., upsetting and damaging a sleeping car.

DERAILMENTS, BROKEN RAIL.

On the 31st a passenger train on the Nashville, Chattanooga & St. Louis road was thrown from the track near Johnsonville, Tenn., by a broken rail. One car upset, injuring three passengers slightly.

On the morning of the 6th two cars of a passenger train on the Texas & Pacific road were thrown from the track near Lake Fork, Tex., by a broken rail. One car was wrecked, injuring 13 passengers.

On the morning of the 7th three cars of a passenger train on the Cincinnati Southern road were thrown from the track near Williamstown, Ky., by a broken rail. One car was damaged and three passengers slightly hurt.

On the night of the 8th a freight train on the Cincinnati, Indianapolis, St. Louis & Chicago road struck a broken rail, near Cleves, O., and four cars were thrown from the track, blocking the road six hours.

On the morning of the 11th a freight train on the South & North Alabama road struck a broken rail near Decatur, Ala., and 14 cars were thrown from the track and piled up in a bad wreck, blocking the road all day. A brakeman was hurt.

Very early on the morning of the 15th a passenger train on the Indianapolis & St. Louis road struck a broken rail at Happy Hollow, Ind., and was thrown from the track. The baggage car was wrecked and the baggageman badly hurt.

On the night of the 17th a special passenger train, with troops on board, on the Houston & Texas Central road was thrown from the track by a broken rail near Corsicana, Tex. Several cars were wrecked, eight men seriously and 40 slightly hurt.

On the 22d a freight train on the Northern Pacific road was thrown from the track near Fargo, Dak., by a broken rail. The fireman was hurt.

Very early on the morning of the 25th a passenger train on the Michigan Central road was thrown from the track in the yard at Jackson, Mich., by a broken rail.

On the 26th a freight train on the Long Island road was thrown from the track near Whitestone, N. Y., by a broken rail and eight cars were damaged.

Very early on the morning of the 27th an express train on the Baltimore & Ohio road was thrown from the track by a broken rail near Sand Patch, Pa. The engine and baggage car were badly broken; the baggageman killed, the engineer and a train-boy hurt.

On the 28th a passenger train on the Denver & Rio Grande road was thrown from the track by a broken rail, near Pueblo, Col. The engine was wrecked, the engineer and fireman killed.

DERAILMENTS, BROKEN WHEEL.

On the evening of the 2d several cars of a freight train on the Philadelphia & Reading road were thrown from the track at the tunnel near East Mahanoy, Pa., by a broken wheel.

On the 14th a freight train on the Louisville & Nashville road was thrown from the track in Nashville, Tenn., by a broken wheel.

On the morning of the 15th the tender of a passenger train on the Western & Atlantic road was thrown from the track near Dalton, Ga., by the breaking of a wheel.

On the afternoon of the 27th the second engine of a passenger train, drawn by two engines on the New York Central & Hudson River road ran off the track at The Forks, N. Y., and nearly all the cars followed it and were badly shaken up. Two passengers were hurt. It is believed that the accident was caused by the breaking of a wheel under the tender.

DERAILMENTS, BROKEN AXLE.

On the morning of the 10th a car of a freight train on the Philadelphia & Reading road was thrown from the track near Moline Crossing, Pa., by a broken axle. The axle broke at the journal, which is said to have been very much heated, the car being overloaded.

On the 12th several cars of a freight train on the Great Western Railway were thrown from the track near Dundas, Ont., by a broken axle.

On the 18th the engine of a passenger train on the Chicago, Burlington & Quincy road was thrown from the track in Peoria, Ill., by the breaking of a truck axle.

On the 20th 12 cars of a freight train on the Wabash, St. Louis & Pacific road were thrown from the track near Strawn, Ill., and wrecked. This accident was caused by the breaking of an axle under one of the cars.

On the morning of the 21st several cars of the coal train on the Philadelphia & Reading road were thrown from the track near Royersford, Pa., by the breaking of an axle.

DERAILMENT, BROKEN CONNECTING ROD.

Early on the morning of the 26th the engine of a freight train on the Pittsburgh, Ft. Wayne & Chicago road, broke a parallel rod when near Worcester, O. The loose end of the rod caught in the ties, throwing the engine and several cars from the track, making a bad wreck and blocking the road six hours.

DERAILMENT, BROKEN BRIDGE.

On the 16th a construction train on the Dallas & Wichita road broke through a temporary bridge over Hickory Creek, near Lewisburg, Tex., and the rear car fell 37 feet into the creek. The car was wrecked, three laborers killed and fourteen injured.

DERAILMENTS, SPREADING OF RAILS.

On the 6th the engine of a passenger train on the St. Martin's & Upham road was thrown from the track near Upham, N. B., by the spreading of the rails.

On the evening of the 8th a passenger train on the Central Vermont road was thrown from the track near New Haven, Vt., by the spreading of the rails. The whole train left the track, blocking the road all night.

On the afternoon of the 10th a car of a freight train on the Connecticut River road was thrown from the track at North Hatfield, Mass., by a frog which had settled out of place. The road was blocked three hours.

On the 26th a passenger train on the Richmond & Danville road was thrown from the track near Greensboro, N. C., by the spreading of the rails. The tender and three cars went into the ditch.

DERAILMENT, LAND-SLIDE.

On the 25th a passenger train on the Southern Pacific road ran into a land-slide near Caliente, Cal., and the engine and three cars were thrown from the track.

DERAILMENTS, ACCIDENTAL OBSTRUCTION.

On the afternoon of the 24, as a freight train on the Louisville & Nashville road was near Franklin, Tenn., a draw-head pulled out and fell on the rails, throwing two cars off the track.

On the 30th four cars of a freight train on the Cumberland & Maurice River road were thrown from the track near Bridgeton, N. J., by a brake beam which dropped from one of the cars upon the rails.

DERAILMENTS, CATTLE.

On the evening of the 7th a passenger train on the Western Railroad, of Alabama, ran over a cow near Chehaw, Ala., and was thrown from the track. The engine rolled down a high bank and was followed by the baggage and mail cars, all being badly wrecked; two passenger cars left the track but did not go down the bank, and the sleeping car remained on the rails. The engineer and fireman were badly, and two other train-men slightly, hurt.

On the afternoon of the 12th a passenger train on the Utah Southern road ran over a cow near Nephi, Utah, and the engine was thrown from the track.

On the 15th a passenger train on the Selma, Rome & Dalton road ran over a cow near Dalton, Ga., throwing the engine from the track, and blocking the road five hours.

On the night of the 16th a passenger train on the Louisville, Cincinnati & Lexington road ran over a cow in a cut near Lagrange, Ky., and several cars were thrown from the track and damaged, blocking the road all night.

On the 16th a passenger train on the Alabama Great Southern road ran over a mule near Elyton, Ala., and was thrown from the track, damaging the engine and several cars, killing one passenger and injuring three others slightly.

On the 19th a freight train on the New York, New Haven & Hartford road ran over a cow near Wilson Station, Conn., and two cars were thrown from the track.

On the afternoon of the 19th a freight train on the Baltimore & Ohio road ran over a lot of sheep near Zanesville, O., and 10 cars were thrown from the track, three being badly broken.

On the night of the 26th a freight train on the Louisville & Nashville road ran over a horse which had fallen into a cut near Pilot Knob, Tenn., and four cars were thrown from the track.

DERAILMENTS, MISPLACED SWITCH.

On the 6th the engine of a coal train on the Montour Branch was thrown from the track near Montour, Pa., by a misplaced switch.

On the morning of the 13th several cars of a freight train on the New York, Lake Erie & Western road were thrown from the track in Middletown, N. Y., by a misplaced switch, blocking the road four hours.

On the morning of the 16th a passenger train on the New-ark Branch of the New York, Lake Erie & Western road was thrown from the track in Paterson, N. J., by a misplaced switch. The engine and one car were damaged and the road blocked an hour.

On the morning of the 16th a local passenger train on the Lehigh Valley road was thrown from the track by a misplaced switch, at Mill Creek, Pa. The whole train went down a high bank and was wrecked, and one car was burned up. A brakeman was killed, a fireman fatally scalded, the engineer, a brakeman and a passenger hurt.

On the 17th a freight train on the Cleveland, Mt. Vernon & Delaware road was thrown from the track near Gambier, O., by a misplaced switch. A brakeman was hurt.

On the afternoon of the 25th the engine and three cars of a freight train on the New York, Lake Erie & Western road were thrown from the track in Elmira, N. Y., by a misplaced switch.

DERAILMENTS, UNEXPLAINED AND MISCELLANEOUS.

On the evening of the 1st an engine on the Norwich & Worcester road, standing in the yard at Norwich, Conn., suddenly started off, and, after running a short distance, went off the end of a siding. The engine ran against a large tree on the bank, which saved it from going into the river, but it was badly damaged.

On the 2d the engine and 12 cars of a freight train on the New York, Lake Erie & Western road ran off the track near Friendship, N. Y., and were badly broken.

On the evening of the 2d the engine and three cars of a

passenger train on the Chicago & Alton road ran off the track near Joliet, Ill. The engineer was hurt.

On the evening of the 3d the engine of a freight train on the Tyrone Division of the Pennsylvania Railroad jumped the track and went down a bank, with 18 cars piled up on it in a bad wreck. The fireman was caught under the engine and killed; the engineer and a brakeman badly hurt.

On the 4th several cars of a freight train on the Houston & Texas Central road ran off the track near Van Alstyne, Tex., and were badly damaged.

Early on the morning of the 5th a repair train on the Delaware, Lackawanna & Western road ran off the track near Madison, N. J., blocking the road an hour.

On the 6th several cars of a freight train on the Houston & Texas Central road were thrown from the track near Kinney, Tex., and wrecked.

On the morning of the 8th a coal train on the Delaware, Lackawanna & Western road ran off the track in Hoboken, N. J., and a number of loaded coal cars were piled upon the tender and wrecked. The engineer jumped, but was caught under a car and killed. The fireman stuck to the engine and was slightly hurt.

On the night of the 9th a freight train on the Texas & New Orleans road ran off the track near Beaumont, Tex., doing some damage.

Early on the morning of the 10th a freight train on the Texas & New Orleans road ran off the track near Beaumont, Tex., blocking the road a short time.

On the morning of the 10th several cars of a freight train on the St. Louis Division of the Louisville & Nashville road were thrown from the track in Mt. Vernon, Ill., and wrecked.

On the morning of the 11th a freight train on the Southern Pacific road ran off the track near San Geronimo, Cal., and several cars were wrecked.

On the 11th the engine of a construction train on the Prince Arthur Landing & Kaministiquia road ran off the track on a curve at Prince Arthur Landing, Can., doing no damage.

On the morning of the 13th a freight train on the Lake Shore & Michigan Southern road was thrown from the track at Forrester, Ind. The engine was thrown over against a freight train standing on a siding, doing much damage and injuring the engineer.

On the morning of the 13th a freight train on the New York & New England road ran off the track near Willimantic, Conn., wrecking several cars.

On the afternoon of the 13th a local passenger train on the New York & New England road ran off the track near Waterbury, Conn., blocking the road several hours.

On the morning of the 15th two cars of a freight train on the Louisville & Nashville road were thrown from the track near Cedar Hill, Tenn., delaying trains several hours.

On the morning of the 16th a freight train on the Pennsylvania Railroad ran off the track near Marion, N. J., and several cars were wrecked, blocking the track an hour. The accident is said to have been caused by an overloaded car upsetting.

On the afternoon of the 18th, as a freight train on the New York, Lake Erie & Western road was making a flying switch in Paterson, N. J., the detached cars were not stopped in time and broke down a bumper block at the end of a siding, running up on the platform and stopping just short of the wall of the passenger station. A car was broken and the platform damaged.

On the night of the 18th some cars of a coal train on the New York, Lake Erie & Western road ran off the track near Chester, N. Y., blocking both tracks for two hours.

On the 19th three cars of a passenger train on the Atchison, Topeka & Santa Fe road ran off the track near Cimarron, N. M., and one upset.

On the afternoon of the 19th a freight train on the Wabash, St. Louis & Pacific road struck a place where section hands had taken up a rail for repairs, without putting out the proper signals. The engine left the track and went over on its side. The engineer was killed.

On the night of the 20th one of the engines of a passenger train (drawn by two engines) on the New York Central & Hudson River road ran off the track, near Canastota, N. Y., delaying the train some time.

On the morning of the 21st a freight train on the Wisconsin & Minnesota road ran off the track near Stanley, Wis., blocking the road some time.

On the evening of the 21st a car of a freight train on the New York, Lake Erie & Western road ran off the track, in the yard at Port Jervis, N. Y., causing some delay.

On the 23d a construction train on the Hastings & Dakota Division of the Chicago, Milwaukee & St. Paul road ran off the track near Ortonville, Minn., wrecking several cars, killing four men and injuring two.

On the morning of the 24th a passenger train on the New York & Greenwood Lake road ran off the track near Montgomery, N. J., blocking the road some time.

On the 24th the engine and several cars of a freight train on the Colorado Central road ran off the track near Boulder, Col., killing the fireman.

On the afternoon of the 25th the rear car of a passenger train on the Gulf, Colorado & Santa Fe road ran off the track near Arcola, Tex., and upset, injuring three passengers.

On the afternoon of the 26th the engine of a freight train on the Grand Junction road ran off the track in Cambridge, Mass., and upset down a bank, damaging itself badly.

On the evening of the 26th four cars of a freight train on the Chicago, Milwaukee & St. Paul road were thrown from the track near McGregor, Ia., and wrecked.

On the morning of the 27th a car of a freight train on the Chicago, Milwaukee & St. Paul road ran off the track in Minneapolis, Minn., and wrecked.

On the morning of the 27th two cars of a freight train on the Buffalo, New York & Philadelphia road ran off the track near Holland, N. Y., and rolled down a high bank. One of the cars rolled right over a gang of section hands who were standing on the bank waiting for the train to pass, killing three and injuring five of them badly.

On the morning of the 28th five cars of a freight train on the Chicago, Milwaukee & St. Paul road were thrown from the track in Oconomowoc, Wis., blocking the road several hours.

On the 28th the engine and one car of a passenger train on the South & North Alabama road were thrown from the track near Oxmoor, Ala., blocking the road some time.

On the morning of the 29th a freight train on the New Orleans Division of the Louisville & Nashville road ran off the track near Bay St. Louis, Miss., blocking the road several hours.

On the 29th a freight train on the Southern Pacific road ran off the track near Yuma, Ariz., and the engine upset in the ditch, injuring the engineer.

BOILER EXPLOSIONS.

On the afternoon of the 3d the engine of a passenger train on the Fall River road exploded its boiler while crossing a bridge near North Westport, Mass. The top and one side of the boiler at the fire-box end were blown out, the cab torn to pieces, the engineer killed and the fireman badly hurt.

On the morning of the 6th a yard engine on the Sioux City & Pacific road exploded its boiler while hauling some

freight cars from the river transfer at Blair, Neb. The engine was completely wrecked, the engineer and fireman hurt.

OTHER ACCIDENTS.

On the afternoon of the 1st an axle broke under a drawing-room car in a passenger train on the New York, New Haven & Hartford road when near Southport, Conn. The car was not thrown from the track, but was successfully brought to Southport and switched there.

On the night of the 1st the engine of a passenger train on the New York, Pennsylvania & Ohio road broke a parallel rod, when near Burghill, Pa., and the end of the rod tore up one side of the cab, killing the engineer.

Early on the morning of the 19th three wheels were broken, apparently while running over a frog, under the tender of a north-bound passenger train on the Chicago & Alton road, causing a detention of one hour. The rims of the wheels—of ordinary chilled cast-iron—were broken completely off from the hubs, but rolled along in their places, being themselves unbroken, about an eighth of a mile, until the train stopped near Elwood, Ill. The damage to the truck frames was not serious.

On the night of the 26th the baggage car of a passenger train on the Texas & Pacific road caught fire when near Sulphur, Tex., and was destroyed, with all the baggage and mails.

This is a total of 145 accidents, by which 40 persons were killed and 185 injured. Twenty-three accidents caused the death of one or more persons; 32 caused injury to persons, but not death, while in 90 cases, or 65.5 per cent. of the whole number, there was no injury serious enough for record.

As compared with November, 1879, there was an increase of 59 accidents, of 24 in the number killed and of 101 in that injured, an extraordinary increase on all points.

These accidents may be classed as to their nature and causes as follows:

COLLISIONS:

Rear collisions..... 36
Butting collisions..... 17
Crossing collisions..... 5
Total..... 58

DERAILMENTS:

Broken rail..... 12
Broken wheel..... 4
Broken axle..... 1
Broken connecting rod..... 1
Broken bridge..... 1
Spreading of rails..... 1
Land-slide..... 1
Accidental obstruction..... 2
Cattle..... 8
Misplaced switch..... 6
Runaway engine..... 1
Overloaded car..... 1
Rail removed for repairs..... 1
Flying switch..... 1
Unexplained..... 33
Total..... 81

Boiler explosion..... 2
Broken axle not causing derailment..... 1
Broken wheel not causing derailment..... 1
Broken connecting rod..... 1
Car turned while running..... 1
Total..... 145

Five collisions were caused by trains breaking in two; four by mistakes in train orders or failure to obey them; no less than three by runaway engines; two by misplaced switches, one by a flying switch, and one by snow.

There were 42 accidents resulting from defect or failure of road or equipment; two from the weather; nine from purely accidental causes which could not be foreseen; 59 from carelessness or defects in management, and 32 were unexplained.

Forty-three accidents took place in the hours of darkness; 86 in daylight, while in 16 cases the hour is not determined.

A division of accidents and casualties according to classes of trains is as follows:

Accidents:	Collisions.	Derailments.	Other.	Total.
To passenger trains.....	13	29	5	47
To a passenger and a freight.....	4	1	1	6
To freight trains.....	41	52	1	94
Total.....	58	81	6	145

Casualties:	Killed.	Injured.
Killed by.....	18	20
Injured by.....	48	114
Total.....	66	134

There is an improvement in the matter of misplaced switches, only eight accidents—two collisions and four derailments—being traced to that cause. There were no malicious derailments. The only broken bridge was a temporary structure on a new road, used until the permanent bridge could be built. One case appears again of that familiar but inexcusable piece of carelessness, the removal of a rail by trackmen without putting out proper signals.

The number of accidents was extraordinary, the largest of any month for the year. The unusually early and sudden appearance of winter has had something to do with this, as, for instance, in the case of the 12 broken rails recorded, but beyond that no special cause can be assigned. Traffic was very heavy all over the country, and the extra demands on equipment, with probably some overworking of train-men may have contributed to swell the number.

For the year ending with November the record is as follows:

	Number of accidents.	Killed.	Injured.
December.....	69	11	50
January.....	62	18	72
February.....	64	16	49
March.....	65	9	33
April.....	71	11	45
May.....	46	30	107
June.....	56	15	77
July.....	78	21	100
August.....	112	49	214
September.....	124	15	54
October.....	120	69	137
November.....	145	40	165
Totals.....	1,012	304	1,103
Same months 1878-79.....	904	183	695
" 1877-78.....	743	196	724

The averages per day for the month were 4.83 accidents,

1.33 killed and 5.50 injured; for the year they were 2.77 accidents, 0.83 killed and 3.01 injured. The average casualties per accident were, for the month, 0.478 killed and 1.138 injured; for the year, 0.300 killed and 1.090 injured.

Report of the Georgia Railroad Commission.

We give below, nearly in full, the second semi-annual report of the Georgia Railroad Commission to the Governor of that state:

In making a second semi-annual report to your excellency, it is our purpose to present a simple review of the action of the commission, and of the general effect of such action upon the railroads of the state. It was our intention to make the present report full and elaborate upon all matters of interest connected with the Commission and its labors; but this has been rendered impossible for the present, by the severe illness of one of the Commissioners. We hope to be able, at no distant day, to present to your excellency a report covering the entire field of our duties and labors.

ACTION.

In the action of the Commission we have sought to keep constantly in view the two great objects of the law, viz., the prevention of extortion, and of unjust discrimination in freight and passenger rates. The whole animus of the Commission has been to do equal and impartial justice to both railroads and people. In our view we have come much nearer this end by our present rules and rates than by those of force at the date of our last report. We reasonably hope for more constant approximation, as study and experience familiarize us with our duties.

There have been complaints, more or less well founded, of the correctness of our views; but in general the comment applies, that local prejudices have yielded, on discussion, to broader views, and that many of the complaints as to discrimination on our part have come from places or classes once the beneficiaries of partial and unfair advantages. It is not unnatural that those favored by unjust discrimination should desire a continuation of that policy.

It would be tedious to go through with the entire work of the Commission, in detail, in the body of a report. We submit herewith to your excellency documents showing our action in establishing rates, rules and regulations for the railroads, and the means adopted by us to prevent unjust discrimination in freight and passenger rates.

RESULTS.

Since the organization of the Commission very material reductions in rates have been effected as a result of its operations, and much has been done in the way of graduating and equalizing rates to standards. One of the most useful effects of the labors of the Commission has been to enlarge mutual knowledge of the railroads and the public, and to bring each to a clearer recognition of the rights and duties of the other. Increased knowledge of rates has been achieved, and the tendency resulting from our work has been to reduce speculation and encourage reliance for success on sound business principles.

PASSENGER RATES.

The maximum passenger rates on many of the railroads of the state have been reduced by the Commissioners' tariff from five cents, and in some instances six cents, per mile to four cents per mile. Experience has shown that this reduction, while greatly beneficial to the public, has not injured the interests of the railroads. On the contrary, the increase of travel occasioned thereby has added materially to the earnings of the roads. The right to reduce passenger fares below the maximum fixed by the Commissioners has not been restricted. The law places these upon a different footing from freight rates, and the Commission has, therefore, left with the railroads themselves the power to fix their respective passenger charges at any amount below the maximum of four cents per mile, established by the Commission.

FREIGHT RATES.

Since our rates went into operation, the revenues from the roads from freight traffic—the most important branch of their business—has largely increased over corresponding periods in previous years; and this, too, in the face of the fact that large reductions in rates on the principal articles of production and consumption have been made. For more particular information, at this point, we respectfully refer your excellency to the statements contained in the accompanying document marked exhibit A.

COMPETITION.

It is evident that there is no advantage to be secured to the people, nor to the railroads of the state, by allowing other roads, not under the jurisdiction of the Commissioners, to take the business uncontrolled by what we regard to be the legitimate principle of competition, yet not of force or recognized by roads without the state's limits. It should be remembered that competition affects the whole round of transportation, from end to end and back, and that this complex condition so largely affecting our roads exists principally beyond our jurisdiction.

The most important regulation adopted by the Commission in regard to competition was briefly referred to in our first report, and is as follows:

"Rule 6.—The freight rates prescribed by the Commission are maximum rates, which shall not be transcended by the railroads. They may carry, however, at less than the prescribed rates, provided that if they carry for less for one person, they shall for the like service carry for the same lessened rate for all persons, except as mentioned hereafter; and if they adopt less freight rates from one station, they shall make a reduction of the same per cent at all stations along the line of road, so as to make no unjust discrimination as against any person or locality.

"When, however, from any point in this state there are competing lines, one or more not subject to the jurisdiction of the Commission, then the line or lines which are so subject, and are working at the lowest rate under the rule, may at such competing point or other point injuriously affected by such competition, make rates below the standard tariff, to meet such competition, without making a corresponding reduction along the line of road."

By this rule it was intended to make competition conform to principles of right and justice. Thus, instead of a war of rates being confined to any little village along the line of two countries, say for example, Canada and the United States, such war, if made, would, under the operation of this rule, be declared along the whole line. The roads may thus make legitimate war, but it would extend to every station on the line. Such we regard to be legitimate competition, as distinguished from illegitimate and injurious competition. If rates are lowered at strictly competitive points alone, the neighboring stations are injured, and a result brought about of freights being shipped back and in the opposite direction to their destination, to be carried a second time over the same part of the road, more cheaply than by direct shipment to the point of delivery. To avoid this result, when the rate is lowered at the immediate point of competition, a graduated rate is supplied to neighboring stations, so as to make the direct charges something less

from the initial point to that of destination than the sum of two rates from the shipping station to the nearest competitive point and thence back to the place of destination.

The Commissioners are of the opinion that they have no power to force competition between the roads, nor do they think they ought to be invested with such power. Experience proves that unrestricted competition is often detrimental to the best interests of the public as well as the carrier. We claim the right to restrict competition within legitimate limits, and we think this object can be accomplished by the enforcement of Rule 6 of our regulations.

EMBARGOES PREVENTED.

The Commissioners have always believed that shippers are entitled to the benefits of any market they may select, according to the natural or artificial advantages it may possess, unrestrained by arbitrary rules. Our labors have been diligently devoted to the accomplishment of this end.

One of our most recent efforts in that direction is shown in the accompanying order, dated Oct 29, 1880. The effect of this order, we think, will be to remove the practical embargo which for some time past has been laid upon commerce between certain points in this state and other points without the state's limits. Heretofore there seems to have existed some reason which induced a number of railroads in the state to decline to receive for shipment more than certain percentages of freights of a particular character or class.

[The order just referred to directed railroad companies to receive freight, when a blockade existed or was threatened, without reference to any arrangements for division of traffic. It was published in full in our columns at the time.]

MANUFACTORIES.

It has been the intention of the Commissioners to permit the railroads to offer such inducements to manufacturers as would encourage them to make investments in the state. This is clearly effected by Note 1 of our rules, from which we give the following extract:

"The rates specified for ores, sand, clay, rough stone, common brick, bones, lumber, shingles, laths, staves, empty barrels, wood, straw, shucks, hay, fodder, corn in ear, tan bark, turpentine, rosin, tar, household goods, and for articles manufactured on or near the line of said road, and for materials used in such manufacture, are maximum rates; but the roads are left free to reduce them at discretion, and all such rates are exempted from the operation of Rule 6."

This note permits the railroad companies to make lower rates for articles manufactured on or near their own lines, or the lines of connecting roads, without coming under the restraining clause in Rule 6; provided no more is charged for a less than for a longer distance.

COMPLAINTS.

Numerous requests and complaints have been received by the Commissioners, both from the citizens and the railroads, and occasional discussions have been heard of conflicting interests. Considering the pumber and importance of the questions presented for solution, the changes made in our tariffs and regulations have been few. The railroad companies, in some instances, casually omitted to furnish us with full information of their unprinted or special rates. Most of the changes made by us, after the first publication of the standard tariff, were rendered necessary by these omissions.

With a view of placing ourselves in possession of the information needed for a proper revision of our standard tariff, we issued a circular, addressed to all the railroad companies of the state, calling on them to furnish us a comparative statement of the earnings and expenses of their respective roads during the months of May and June, 1879 and 1880. The action of the Commissioners, based upon responses to this circular is embodied in Circulars Nos. 7, 8, 9 and 10, herewith transmitted.

The operation of Circular No. 10 has led to some discussion, not so much in regard to actual as to relative rates. The Commissioners gave the whole subject their most thoughtful consideration, and we think that their action will be found satisfactory.

The question of the operation of the Central Railroad as a unit, or in the several divisions expressed in Circular 10, was much argued. In our opinion, the conclusion reached by the Commissioners was correct, and the only one consistent with authority. Enforced unity, against the consent of the railroad companies, we did not consider within our province.

The whole subject of joint rates between railroads in this state is gradually opening before us, the chief principles having been, to some extent, involved in the relation of local and joint rates on the several divisions of the Central Railroad. The Commissioners have never believed that they had the power, under the law, to make a joint rate between points on any two roads, which would be less in amount than the sums of the local rates charged on such roads between these points, except by the request or consent of the roads interested.

CLASSIFICATIONS.

The classifications of railroad freight tariffs have ever been undergoing changes. That adopted by the Southern Railway & Steamship Association, and stereotyped in February, 1880, it was thought by many prominent railroad officials, would remain unchanged for a considerable time. Since then, however, another and different classification has been found necessary. Some persons have thought the Commissioners too unyielding, because of the very few changes made in our standard tariff and classification since they went into effect. As every change involves heavy expense for printing, we have made only such, as in our judgment, strict justice and pressing necessity required.

[The report then refers to the expense incurred by the publication of the standard tariffs, etc., in certain newspapers, which was considerable, but the publication was imperatively required by law. Outside of this the actual expenses of the Commission were within the \$500 appropriated by the Legislature.]

LITIGATION.

In the spring of the present year, Morris K. Jesup, trustee, etc., filed his bill in chancery in the Circuit Court of the United States for the Northern District of Georgia, praying that the Commissioners be restrained from enforcing their rates and regulations on the Savannah, Florida & Western Railroad. Upon the hearing of the application for injunction, the bill was dismissed. Immediately thereafter another bill was filed, however, by George H. Tilley, in the same Court, asking for a similar remedy. A restraining order was granted in this case by the Court, enjoining the Commissioners from enforcing their established rates on said railroads until the further order of the Court. The application for injunction in the case of Tilley has been continued from time to time, at the instance of the complainant, and is still pending.

In consequence of this action by the Court the Commissioners' rates have not yet gone into operation on the Savannah, Florida & Western Railroad. No other litigation, that we have been advised of, involving the action of the Commissioners, has been instituted. We transmit herewith a

copy of the affidavit filed by the Commissioners in response to the application for injunction in said case, which will furnish your excellency with a clear statement of the reasons which controlled us in establishing our standard rates and regulations. The railroad companies, with the exception mentioned, have complied in the main with the rates, rules and regulations of the Commissioners, although the law gives us no power to summarily enforce our action. In view of the great interest effected by our action, this may justly be considered a most gratifying result.

BOOK-KEEPING AND OPERATION OF RAILROADS.

Our report upon the condition and operation of the railroads of the state cannot be as full and satisfactory as it would be with a good and uniform system of book-keeping on the part of the several roads. Some have very good systems, but they are diverse, and for some purposes connected with a report intelligible to the public, are not the very best. Few persons appreciate the difficulty of getting at any facts from such reports, not intended specially to be presented, and of tabulating such facts in any satisfactory form.

We are preparing forms for a more complete system, embracing all the useful particulars to record the business of the roads and make it intelligible to all. To achieve these desirable objects, not only book-keeping, but the principles of tabulation need to be studied and thoroughly mastered.

The system we are preparing will comprise full information of the capital invested in each road, the annual earnings of each road, the rates and tonnage of each, the annual expenses, the profits made and the use made of the same, the effect of the action of the Commission on each road, the actual savings to the public due to the action of the Commission, the light of comparison furnished to the railroads, the need of economy on the part of the roads, and the inward and outward tonnage and business of each station, etc.

A general as well as a detailed view, necessary to render reference back and forth easy, thereby reducing the area of conjecture and enlarging that of calculation, will be supplied. The comparative method—the great means of improvement which gives a sense of security and mastery, will be provided for. This system will enable every one to obtain a better general idea of the extent and importance of the railroad property of the state, and of the great interest of the public therein.

In addition to the value to the public and to the railroads, of such a system of reports, one of the chief advantages resulting therefrom will be the establishing of a proper basis for taxation of railroads and railroad property in the state, which information the operations of the Commission under this system would always exhibit.

SECRETARY, ETC.

The Commissioners, believing it best to secure the services of a Secretary thoroughly versed in railroad business, elected Mr. R. A. Bacon to that position. The salary now allowed him by law does not compensate him adequately for the labor and peculiar skill and knowledge required in performing the duties of his place. We respectfully suggest that your excellency recommend to the General Assembly the propriety of authorizing such an increase of the salary of the Secretary as will justly compensate him for his services.

In submitting this imperfect report to your excellency, we desire to state that it will be our pleasure, as it is our duty, to furnish to your excellency and to the General Assembly all the information in our power with reference to the important interests which have engaged our attention during the past year. Respectfully submitted,

JAMES M. SMITH,
CAMPBELL WALLACE,
SAMUEL BARNETT,
Railroad Commissioners.

EXHIBIT NO. 2, TABLES.

Giving rates of freight on principal articles of production and consumption, charged according to published tariffs, by railroads in Georgia (over 75 miles in length), prior to the issuance of commissioners' standard tariff for 10 miles, 50 miles, 140 miles, 200 miles and 250 miles, and standard tariff rates on same articles and for same distance.

	Fifth.	Fourth.	Third.	Second.	First.	Fertilizers.
RATES FOR 10 MILES.						
Central R. R., Sav. Div.	65 25 22 20	30	20	15	25 08	
Central R. R., Atlanta Div.	30 18 15 13	13	13	10	10	
Northeastern	18 12 10 08	10	08	06	07 05	
Georgia R. R.	23 15 12 10	12	10	10	10	
Sav. Fla. & Western	07 07 06 05	07	05	05	07	
Western & Atlantic	35 20 18 15	15	15	10	30 10	
Atlanta & West Point	18 10 09 08	08	06	05	10 04	
Macon & Brunswick	30 20 18 16	12	12	08	15 06	
Brunswick & Albany R. R.	45 20 15 12	12	12	12	12 08	
Commissioners' Standard Tariff	46 20 18 15	15	15	15	45	
	16 10 09 08	08	06	05	12 05	
RATES FOR 50 MILES.						
Central R. R., Sav. Div.	70 30 25 22	22	22	18	30 08	
Central R. R., Atlanta Div.	60 30 25 20	20	20	15	30	
Atlanta & C. Air-Line	40 24 20 17	20	17	17	21 15	
Georgia R. R.	27 21 19 16	21	16	12	27 06	
Sav. Fla. & Western	65 55 45 35	30	35	20	75 15	
Western & Atlantic	32 24 20 14	12	10	09	20 04	
Atlanta & West Point	40 32 28 23	21	24	14	25 09	
Macon & Brunswick	68 35 30 25	23	24	25	30 08	
Brunswick & Albany	60 30 25 20	20	20	20	45	
Commissioners' Standard Tariff	30 22 18 13	13	10	09	20 08	
RATES FOR 100 MILES.						
Central R. R., Sav. Div.	80 35 30 25	25	25	22	40 12	
Central R. R., Atlanta Div.	70 45 30 25	25	25	22	30	
Atlanta & C. Air-Line	58 33 29 24	29	24	24	26 15	
Georgia R. R.	48 32 25 20	32	20	15	38	
Sav. Fla. & Western	90 65 55 45	35	42	23	75 15	
Western & Atlantic	45 35 30 24	20	15	15	25 10	
Macon & Brunswick	70 45 35 30	25	25	20	40 10	
Brunswick & Albany	70 45 35 30	25	25	20	45	
Commissioners' Standard Tariff	45 30 23 18	18	15	14	33 10	
RATES FOR 140 MILES.						
Central R. R., Sav. Div.	85 38 33 28	28	28	23	40 12	
Atlanta & C. Air-Line	67 40 32 28	32	28	28	26 15	
Georgia R. R.	62 36 27 22	36	22	17	42	
Sav. Fla. & Western	90 65 55 45	35	42	23	75 15	
Macon & Brunswick	50 40 35 30	25	20	19	25 10	
Brunswick & Albany	85 40 35 30	30	29	30	40 12	
Commissioners' Standard Tariff	85 50 45 35	30	30	25	45	
	57 34 27 22	22	19	18	34 11	
RATES FOR 200 MILES.						
Central Railroad	120 65 55 40	40	40	35	55 20	
Atlanta & C. Air-Line	82 52 42 38	42	33	33	42 15	
Georgia R. R.	65 40 30 25	40	25	20	45	
Sav. Fla. & Western	100 70 61 50	40	45	30	75 15	
Commissioners' Standard Tariff	70 40 32 27	27	23	20	37 13	
RATES FOR 250 MILES.						
Central Railroad	130 70 60 45	45	45	40	65 20	
Atlanta & C. Air-Line	93 61 48 38	48	38	38	42 15	
Sav. Fla. & Western	110 65 65 55	45	47	30	75 15	
Commissioners' Standard Tariff	75 45 35 30	30	35	22	40 15	

Car-Painting.

[A paper read before a meeting of the Master Car-builders' Association, in New York, Dec. 16, 1880, by N. C. White, editor of the *Painters' Magazine*.]

I am glad, on this occasion, in response to your invitation, to suggest some points on paint and painting. In the start I am embarrassed by the numberless topics and questions which are involved in this branch of your work. I have, therefore, resolved, under some general heads, touching the process involved in car-painting, to make more special reference to the kind and quality of materials that will produce the best work, and at the same time subserve the requirements of decoration and economy. You appreciate the fact that decoration cannot be ignored in the painting of a passenger coach, and you need not to be assured that tasteful and becoming decoration is consistent with the most rigid rules of economy. In other words, beauty of finish, while it need not add materially to the expense of painting a coach, will greatly improve its wearing qualities, and enhance its practical value and usefulness. Painting is in the first instance economic. That is to say, the wood work is painted to protect the material, whether wood or iron, from the elements, and thus to prolong its age of usefulness. Happily, beauty of finish, and even decoration, subserve the same end, and no railroad man will deny that beauty has its utilities in this regard. This is a topic upon which I should like to enlarge, but time and the field I have marked out will not permit. The process of painting a passenger coach may be grouped under four heads:

1. The wood-work.
2. The priming.
3. The painting or coloring.
4. The finishing and varnishing.

The wood-work must be dry. Any surplus moisture will endanger the protecting coats. It may also be added that a coat of paint will even hasten the decay of green timber. This has been proved in the building of wooden bridges, and is very easily accounted for, though not pertinent here. Green timber is not used in the construction of cars, and is alluded to only to emphasize the importance of employing timber which is thoroughly dried. Again, wood-work sometimes presents another difficulty to the painter. I allude to the semi-glazed surface with which it often comes into the paint shop. This is more frequently the result of the action of the machinery by means of which it is worked and surfaced. Paint will not so safely adhere to such a surface. The difficulty is particularly marked and serious in resinous woods, on which the action of the knives of the planing machine often leave a gummy or resinous coating which fills the pores of the wood and interferes with the adhesive qualities of the paint. In view of this it has been recommended by a practical writer in the *Painters' Magazine* that a clap-boarded house should be left to more or less exposure from the elements before priming and painting. The theory is that the exposure and wetting disintegrates the gummy or resinous surface, and renders it more favorable to a perfect adhesion of the paint.

Kindred to this is the recommendation of sponging work before priming, by many painters. It is said that in many of the large carriage shops the practice is adopted of sponging the wood-work with hot water before applying the priming. The water brings out the more susceptible fibres, which, when sandpapered off, leave a good surface. This is recommended also upon another theory, and that is as a preventive against the risk of subsequent injury to the coating by climatic influences. It is to be supposed that the wood is protected against any such action by the paint which is applied, but, nevertheless, if by any means dampness penetrated to the wood, causing the fibres to raise, injury to the painting and finishing would be likely to result. By wetting and sandpapering this difficulty is supposed to be avoided, and the consequences of a subsequent raising of the fibre by any climatic influence less likely to result.

2. The Priming.—This is not by any means the least important of the various steps in the process of painting. It is the foundation, and upon its excellence depends the quality of the subsequent work. The purpose of priming is to fill the pores of the wood with a solid cohesive or elastic substance, which shall readily assimilate with and take to itself any subsequent coatings this work may require, and he is wise who adapts his means to the desired end. It is too often put into the hands of careless and inexperienced workmen, and some painters think anything in the shape of paint will answer for a primer. On the contrary, it bears the same relation to the subsequent coats which the foundation of a building does to the superstructure. A defect in the first endangers the whole. With reference to material, it should be of the best. Good white lead and raw oil, with enough litharge or other dryer to avoid any fattiness of the oil are the essential components. The patent primers, or those made by some vaunted secret formula, cannot be recommended. On the other hand, it is a mistake to suppose that a primer can be carelessly made or mixed. As I have said, the materials should be of the best, and the ingredients thoroughly incorporated and assimilated with one another.

As an illustration of the care which an experienced and skillful painter expends on his primer, let me quote from Mr. John Rattenbury. He says: "To one gallon of raw oil I put one pound of litharge and shake three or four times a day. After a few days allow it to settle, and then strain." He thus insures a thorough incorporation of the dryer and the oil, and frees the latter from any fattiness. The lead is mixed with equal parts of this oil and turpentine for the first coat, and these thoroughly incorporated by agitation. For the second coat two parts of turpentine to one of oil are used, to which is added a small portion of japan. Supposing then, two coats carefully applied, evenly laid with sufficient intervals after each for thoroughly drying, and you have secured the main points sought in a priming or filler. This, when putted, sandpapered and levelled down, is ready for a third coat of more body. For this, ground lead reduced with turpentine and a small quantity of japan or gold size is recommended. Next follows a fourth coating, to which is usually added some permanent color, for instance, ochre or umber, ground in equal parts of oil and japan. The color used will be selected as well with reference to permanence as to the subsequent color in which the work is to be finished. A coat of rough stuff to the hard wood is usually applied here, followed by a fifth coat of lead, thinned like the other with turpentine, to which is added a small quantity of japan. After being thoroughly sandpapered and worked down, it is ready for the coloring coats.

Now let us look at the rationale of this process. It will be seen that, besides the litharge in the prepared oil, there is present in every coat the hard drying japan, and every coat is made flat by excess of turpentine. This secures a hard-drying, thin, compact and permanent surface. This is necessary, because the outer coats, both of the color and the ultimate finish, must be necessarily hard-drying. From the nature of the exposure to which coach and car work is subjected, it follows that the outer coat, which protects the colors and work beneath, shall be varnish in some form. Hence the various

coatings from first to last must bear a kindred relation to one another in this respect. It will readily be seen that if a hard and quick-drying surface like varnish be applied to a coating rich in oil, and slow-drying, from the unequal degrees of shrinkage of the two coats, a conflict must follow, and one or both must yield—usually both. Hence cracking and other "deviltries," of which we hear so much. Mr. McKeon, Secretary of the Master Car-Painters' Association, in a debate once said: "Hard-drying varnish was the cause of most of our paint cracking;" and Mr. A. N. Bradley, of the O. & M. R. R., in the same convention, in giving his formula for colors, said: "I do not believe in oil, but just enough to bind the paint. Varnish must protect it, and it was not intended (in this class of work), that the color should have any wearing qualities in itself." And Mr. Cox, another painter, said he did not use rubbing varnish in finishing, as it dried harder than the paint under it, and the work must crack.

Secondly, I have said an excess of turpentine enters into all of the primary coats, and why? A flat surface is secured, and again the paint is thereby disseminated, and as thin a coat insured as is compatible with perfect covering. Turpentine has no body, nor is it a dryer.

It will also be seen in this connection how important a part Japan plays in car-painting, as well in the primary as in the colors. It is not second in importance even to the white lead or oil. You want no barytes in your lead, no fish, cotton-seed or mineral oil in your paint, and you must have a reliable and perfect Japan. It is essentially a chemical combination and its essential qualities are: 1. Its chemical equivalents must be perfectly neutralized, so that no reaction shall take place on being mixed with paints or colors. 2. Its drying properties must be so nicely balanced that it will not curdle on contact with oils in the paints. This may be referred to its chemical properties and might have been included in the former specification. 3. It must have a good body, and, 4. readily assimilate with oil or any other vehicle which may be employed in the mixing and grinding of paints. The best is made from shellac as a base. But there are cheap shellacs and cheap ways of making Japan; for it is sold in the market at all prices from fifty cents up. I owe no apology for cautioning buyers and painters against the trash which is put upon the market. If you have not the means or time to test them, buy of a responsible manufacturer—of a house that cannot afford to sell its reputation for the paltry profits which would come from the supply of the whole demand. Color manufacturers of any repute make their own Japan for the mixing and grinding of their own colors which require this vehicle, and it is safe to buy of them, for they would not dare risk their valuable colors in a poor varnish for vehicle.

2. *Coloring of Painting.*—We have now reached the third point in our grouping of topics, that of coloring in the process of painting. It must necessarily be very general as to this step. The color is applied in not less than two coats, frequently three or more, whether it is done by mixing before application, or whether it is done by glazing, where two colors are applied, the one upon the other, or by stippling. For the reasons which I have already given, oil must be sparingly used, and on the other hand it should not set so quickly as to show brush marks, nor carry so much dryer as to injure the paint. Work the color quickly, evenly, and brush out well. The same cautions apply here as in the case of the priming coats, as to time for thorough drying between the several coats. It must not be forgotten that it is to be finished by a coating of hard-drying varnish, as a protection to the whole. It must, therefore, be a hard-dried, solid and permanent coating.

A great deal is said about elastic coats of paint. In fact, no such term is properly applicable to paint, as applied to coach and fine car work. It may be soft and elastic when put on, and may remain so for some time, depending upon its drying property, but it must eventually dry and solidify, and become firm and permanent. With the drying, shrinking necessarily takes place, and this is the cause of a large part of the cracking, of which we hear so much. Until a coat is thoroughly dry, and reduced to its ultimate degree of hardness, it is not ready for a second coat. Hence it comes that the different coats must have about the same drying quality, or at least must be thoroughly dry before they shall be covered with another. According to this theory, it follows that each coat should be as thin as is possible, and, above all, thoroughly dry. Time, therefore, is an important element in securing durable and economic painting, and superintendents and other superiors in this department of construction should, to the extent of their authority, secure in the painting of cars and coaches full time and a proper temperature for drying the respective coatings.

Not a little has been said and written as to whether a light or dark body color is the most durable. Practical painters of equal experience and skill disagree on this point. This topic was broached at the Master Car-Painters' convention of 1879. Since then several articles on the subject have appeared in the *Painters' Magazine*, and at the convention of this year it was formally and elaborately discussed. Nothing was definitely settled, and opinions were about equally divided. One fact, however, was emphasized, and that is that there has been great trouble in many shops, and both colors and paints have faded or begrimed, and that coatings, both of color and varnish, have soon perished, and their debris has been necessarily displaced by touching up and new finishing coats. Another fact has been brought out by this discussion, to wit, that there are chemical questions involved in this subject which have not been fully discussed. Mr. Davis, who read the leading paper, started off with the suggestion that study of chemistry was involved, but as he was not a chemist, he could discuss the matter only in the light of his own practical experience. It is true that there are chemical affinities and chemical incompatibilities among paints as in medicines, and as Mr. Davis said, it is difficult to come to anything like a satisfactory conclusion on this subject without the aid of chemical science. For instance, all painters ought to know that it is unsafe to tint white lead with any color which carries sulphur in its combination. The chemical equivalents of the two brought in contact, a sulphide of lead, which is black, is formed, and stains the paint of which it is a part. It is the same process which occurs on the exposure of white lead to the action of noxious gases, like sulphuretted hydrogen, or the effluvia from a sink or privy. So, too, the orange pigments, arsenical yellows, masticot, red lead, are dangerous in tinting white lead. All colors are chemical combinations, except, at least, the purely vegetable. Even umber, sienna, and other ochrous earths, called natural colors, are nevertheless the results of chemical combination. The coloring property is oxide of iron, more or less modified by the chemical composition of the aluminous clay with which the oxide is combined. On the other hand, most of the colors and pigments are manufactured chemically, especially the more brilliant and positive. Now it is undoubtedly true that in the production of secondary tints and shades, incompatibilities may be introduced; and, although the desired tint or shade is produced, the chemical reaction of the equivalents will sooner or later destroy both, and a failure results, though each may have been alone a permanent color. Here it is where theory, another term for science, asserts its importance. Hence it

will not do to decry theory in painting. The truth is that theory and practice must work alongside, and only as they work in harmony do we arrive at true results. We have not time further to pursue this line of inquiry. If I have said enough to develop the intricacies and practical uncertainties which are involved in the economic painting of a railway coach, I have accomplished my purpose. As to the relative durability of light and dark colors, my own settled conviction is that it depends more on the inherent qualities of the colors themselves than upon their light tint or dark shade. The fact is, that the formation of colors, tints and shades, by combinations of primary or secondary pigments, is of itself an intricate art.

It involves:

1. A scientific knowledge of pigments themselves, their composition, etc.

2. An experimental knowledge of their chemical relations to each other, so as to avoid, in mixing, the risk of reactions among their equivalents, and the eventual destruction of their coloring properties.

3. There is more than one combination, usually several, for producing a given tint or shade. The art consists in using such primitive colors as will not react destructively upon one another, and not forgetting that the simplest combination, or one with the least constituents, is the safest and best. These considerations show that the preparation of pigments and colors must be made by an expert scientist or theorist, and, at the same time, he should have the qualifications of a practical painter. In other words, he must be well acquainted with the chemical relations of the pigments and colors which he combines, coupled with a thorough experience in the practical application for which his colors and paints are designed.

As color is the primal element of beauty in all economic and decorative painting, so the art of color-making becomes an art of the highest importance, both to the operative painter and to those who employ colors or paints in their manufactures. It is a general complaint among painters that it is very difficult to procure reliable paints and colors. There is no doubt a large amount of poor material put upon the market, and it is also not easy on mere inspection to distinguish between the good, the bad and indifferent. Nor is it practicable to test by application the merits of this sort of goods. It comes to this, that the consumer has no guarantee of quality other than that which is afforded by the reputation and responsibility of the manufacturer. As with the artist who paints his pictures for immortality, and must have good colors and pigments; so the painter who wishes to do good work on economic principles must, in these days, rely on the color manufacturer. Neither artists or painters undertake now-a-days to make or grind their paints, and it is obvious, at a glance, that the color-makers can make and grind this material better and cheaper than could the painter himself. And if, as is necessarily the case, the colors and pigments are to be mixed and ground, the man who makes it his exclusive business will best be able to combine them on scientific principles, and the best adapt them to the desired purposes. When, therefore, I have heard, as I have in my position, so frequently, of the troubles of painters, I have wondered that some responsible color house has not before this undertaken to supply the want which is so generally expressed.

It is, therefore, with pleasure I state that one of our oldest and best known color manufacturing houses, Messrs. F. W. Devoe & Co., has already entered upon this field. I have seen some of the beautiful specimens of their colors and tints compounded upon the principles to which I alluded; and that they have, by careful theory and experimental manipulation, been able to secure the very best possible results in this important branch—results to which the commercial reputation of this house will be a sufficient guaranty of quality. The want is as I have intimated, permanent and reliable tints, and intermediate or secondary colors, for use in the painting of railway coaches and cars.

In view of the intricacies involved in this branch, I cannot but regard this as the safest and most economical method of producing color and tints. The consumer will thus secure the results of expert and practical skill, both in the compounding and manipulation of colors. This will be secured the benefits and economy of the best and most perfect facilities for grinding. In this way, above all, the consumer will have, in the reputation and responsibility of the manufacturer, the very best guaranty of quality in all the materials used.

I do not dare to hope that the points I have thus briefly set forth will escape criticism. On the contrary, they are thrown out with the hope that they will challenge discussion among the practical gentlemen present, and that thus the main purpose of this organization, mutual improvement, will be promoted.

The Maintenance of Connecting Curves and Super-elevated Tracks.

[Translated for the Railroad Gazette from the Journal of the German Railroad Union.]

The curves are always the vulnerable points of the permanent way of a railroad. Taken in the abstract, they may be as safe, as far as the operation of the road is concerned, as any other portion of the track, and it has been observed that the swerving and oscillation of the cars is much more noticeable in the straight portions of the line than in the curves, where they are pressed firmly against the outer rail; but the curve is much more difficult to maintain in its original and normal condition, and may possibly, under certain circumstances, assume a form which does not show the least resemblance to the original design. This applies particularly to such curves as are constructed with a parabolic connecting curve. The parabolic connecting curve was first made known by Chief Engineer Nördling, of the Orleans (France) Central Railroad, and was by him theoretically demonstrated; but it has up to the present time found few friends among the operating officials. Even after they had been universally adopted by order of the superior constructing officials, they totally disappeared in the course of a few years, partly because they could not be maintained with the aid of the then existing staff of trackmen. The imperative reason for the adoption of the connecting or adjustment curve may be found, as is well known, in the fact that the super-elevation of the outer rail that becomes necessary in the construction of a circular curve, must be attained gradually from the normal track level, and this can only be successfully arranged by the simultaneous construction of a curve, which, with a radius of curvature at the point of commencement infinitely large, shall, at its termination, that is, at the commencement of the circular curve, possess a radius of curvature equal to that of the latter. But the result achieved does not as yet meet practical requirements, as Division Engineer O. Sarrazin, of Coblenz, endeavors to show in an article in the *Architect's and Engineer's Weekly*, and for the reason that in establishing the theory only a direct forward movement of the cars on the centre line of the track could be taken into consideration, while, in reality, they are subject to a series of jerks, which causes them to oscillate right and left, and under certain circumstances, particularly when these oscillations take

effect in an opposite direction to the curvature of the track, the efficiency of the adjustment curve and the corresponding super-elevated track may be entirely neutralized. This will cause a more powerful abrasion of the flanges of the wheels against the outer rail, which, should it occur repeatedly, is likely not only to jeopardize the proper arrangement of the track, but also the maintenance of the normal gauge. On some railroads, and particularly in the case of that part of the Oberlahnstein-Coblenz-Guls Railroad, which was opened last year, and which contains numerous curves, the management has sought to remedy this serious evil by beginning the super-elevation of the rails, in spite of the theory governing this arrangement of the track, some distance before the commencement of the curve, i. e., in the straight portion of the track. By this means the cars, before they enter the curve, have already acquired to some extent their side leaning, thus creating a certain amount of centripetal force which effectually counteracts the shocks caused by centrifugal force. In the same manner a similar arrangement exercises a favorable influence in the passage of cars from the curved to the straight track, it being well known that the centrifugal force developed while passing through the curve causes an appreciable pressure of the foremost wheels against the outer rail on entering the straight track.

The amount of super-elevation which it is found most advantageous to give the outer rail at the commencement of the curve cannot be theoretically determined, as it is impossible to place the oscillations and side thrusts of the cars under observation; the experience of the operating officials only can be relied on. Extensive experiments to this end were undertaken on several railroads with varied lengths of super-elevation within a similar length of track, and the result arrived at was, that the entrance into the curve ensues in the gentlest manner when, at the commencement of the curve, the outer rail already has half the super-elevation required in the whole curve. Herefrom originated the rule, which, taking into consideration § 17 of the Technical Union arrangements for the year 1876 providing that the super-elevation must be complete at the tangential points of the circle, provides that the length of the super-elevation shall be made equal to double the length of the connecting curve, and in such form that one-half the super-elevation shall come in the connecting curve and the other half on the straight track. This rule, already approved, admits only of exception where reversed curves are placed so close together that the straight track lying between them is not sufficiently long. It is then necessary to shorten that part of the super-elevation that comes on the straight track to such an extent as will conform with the short space at command.

These arrangements will result in abnormal standards for the length of the connecting sections, and, as the ordinary laborers, who have very little capacity as it is for tables or printed directions, must be entrusted with the maintenance of the connecting sections as well as with the regulation of the remaining part of the track; it will be absolutely necessary, to ensure a proper determination of these distances, to fix them on the very spot; that is, to have them put on the curve tables. These should always be placed at the commencing point of the connecting curve, so that they will then be in the centre of the super-elevated portion of the track. They should include the following information: 1. The radius of the circular curve; 2. the remark "with connecting curve"; 3. the height of super-elevation for the curve; 4. the distance which the super-elevation extends from the commencement of the curve toward the curve itself and toward the straight track, whereby the length of that part extending toward the curve will at the same time furnish the measure for the length of the connecting curve. To give the length of the circular curve seems superfluous, as does also the employment of a bent arrow to show the direction of the curve.

Such an arrangement, while it will on one side facilitate the somewhat complicated work of revising the connecting parts of the track and allow of a prompt and exact examination of details in the simplest manner, will, on the other hand, provide the men entrusted with the maintenance and regulation of the track with the necessary instruction on the spot and obviate the method of working by guess or "rule of thumb," at present so largely practiced.

"Drew the Wrong Lever!"

[The following, from the English magazine *Good Words*, is by Alexander Anderson, for many years a "surfaceman" (track hand) on a Scotch railroad, who has published two or three volumes of poetry.]

This is what the pointsman said,
With both hands at his throbbing head:

"I drew the wrong lever standing here
And the danger signals stood at clear:

"But before I could draw it back again
On came the fast express, and then—

"Then came a roar and a crash that shook
This cabin-floor, but I could not look

"At the wreck, for I knew the dead would peer
With strange dull eyes at their murderer here."

"Drew the wrong lever?" "Yes, I say!
Go, tell my wife, and—take me away!"

That was what the pointsman said,
With both hands at his throbbing head.

O ye of this nineteenth century time,
Who hold low dividends as a crime,

Listen. So long as a twelve-hours' strain
Rests like a load of lead on the brain,

With its ringing of bells and rolling of wheels,
Drawing of levers until one feels

The hands grow numb with a nerveless touch,
And the handles shake and slip in the clutch,

So long will ye have pointsmen to say—
"Drew the wrong lever! take me away!"

A Brave Act.

A dispatch from Cincinnati, Dec. 6, says: "Near Hagerstown, Ind., this morning, John Haberstrow, section-hand, heroically sacrificed his own life to save those of others. He was on a hand car in a narrow cut, when an extra passenger train came on him. He could easily have saved his own life, but, thoughtful of the lives of those on the train, he dragged the hand-car off, but was struck and killed. The train escaped without injury."

The Barbed Wire Patent.

In the United States District Court at Chicago, Dec. 16, Judge Blodgett, in the suit of Washburn & Moen, for infringement of the patent of Hunt & Glidden for barbed wire fencing, decided that the patents were valid. This is a very important case, and an enormous amount of the fencing is used, largely by railroads, and there are several manu-



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EDITORIAL ANNOUNCEMENTS.

Addresses.—Business letters should be addressed and drafts made payable to THE RAILROAD GAZETTE. Communications for the attention of the Editors should be addressed EDITOR RAILROAD GAZETTE.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

THE CHESAPEAKE & OHIO.

The Chesapeake & Ohio Railway shows a material improvement in its business for the last fiscal year over any preceding year since it was completed. This line is one of great possibilities, and, aside from through business, it is almost certain at some day to have a very heavy traffic. But at the present time the population and production on its line quite are light. Its local traffic depends largely on the development of the vast coal and iron properties in West Virginia, where there is almost sure to be at some time the seat of a vast iron industry. But the road was completed just as the iron business collapsed, and since that time the demand for iron, until within a year or so, has not been sufficient to warrant any great development of iron manufactures in a new district. Now, however, all the circumstances are favorable, and we may expect a steady growth of coal and iron production on this line hereafter.

Another thing which must have benefited this road materially during the past year, and will benefit it still more when its connections with the West is completed, is the maintenance of through rates between the East and the West. The Chesapeake & Ohio is a part of a long route from Western cities to points as far north as Baltimore, and part of it at present consists of ocean and river. It probably costs the carriers considerably more to take freight from New York to Louisville or St. Louis, not to say Indianapolis or Chicago, by this route than by the more direct all-rail routes further north. Consequently, when the all-rail rates were down to cost or less by these routes, as they have been a very large part of the time until recently, there was no advantage to the Chesapeake & Ohio in taking any part of the traffic, for which it has to accept less than the all-rail rates. But since rates have been maintained so as to leave a margin of profit, it has been able to get a share of the business, by offering lower rates than those of the through lines further north, and make some money on it. For the whole of the last fiscal year this has

been the condition of things, and some part of the improvement must be due to this.

The gross earnings, working expenses and net earnings of the road since it was completed have been:

	Gross earnings.	Expenses.	Net earnings.
1873-74.....	\$1,460,190	\$1,214,340	\$245,850
1874-75.....	1,459,189	1,112,321	346,868
1875-76.....	1,569,512	1,243,036	326,476
1876-77.....	1,702,533	1,363,225	339,308
1877-78.....	1,630,300	1,594,739	35,561
1878-79.....	1,891,542	1,507,393	384,149
1879-80.....	2,514,245	1,945,018	569,227

Thus, although the gross earnings had increased considerably before last year, the expenses increased quite as fast, so that net earnings hardly improved at all. Last year the increase over 1879 was 33 per cent. in gross earnings, 29 per cent. in expenses, and 48 per cent. in net earnings. It still required 77½ per cent. of the earnings to pay expenses, but that is an improvement over the 79½, 82½ and 80 per cent. of the three years before 1880. This must be largely due to the large proportion of through freight and of coal carried at very low rates, in order to make a market for it. In 1879 the average rate received per ton per mile was only 0.862 cent. per ton per mile, and in 1880 only 0.88 cent., which is very much lower than any other Southern road that we know of, but little higher than on the three Northern trunk lines, and lower, we imagine, than on any other road with no larger traffic and earnings. These latter were only \$4,373 per mile in 1878-79, and even in 1879-80 they were only \$5,753 per mile.

The completion of the extension of this road, now near at hand, will give it a short all-rail line to the mouth of the James, and a tolerably direct one to Baltimore, from Louisville, Cincinnati and St. Louis, and all Ohio River towns. To places further north it will be less direct, and from such places as Chicago and Milwaukee to New York it will be very circuitous, and the freight will first have to be taken three or four hundred miles south, and at the other end of the route be brought as far north; moreover, at the eastern end of the route there is no railroad which is interested in taking the freight north from Richmond on a *pro rata* basis, and the company will probably depend upon steamboats, as it now does. But if it cannot carry freight to advantage from Western places so far north, it still can carry from them, and so will be able to affect rates, and probably compel the competing roads to give it a larger share of the Ohio valley traffic which it can carry at a profit, than they would be willing to grant if it did not have the power to spoil a larger business for them elsewhere.

It will be greatly to the advantage of this company to establish an export trade in grain and provisions from the Atlantic terminus of its road (which will be at Hampton Roads, near Norfolk). How far it will succeed remains to be seen. Experience has shown that the provision exports are not easily diverted from New York and Boston. Baltimore, which, within a few years, has created an enormous grain export trade, and has perfect connections with all the great packing centres, has but trifling exports of provisions. With grain it is different. There are now great exports of cotton from Norfolk, and grain is advantageous for filling up cotton cargoes; at least, there is already such a business established that vessels resort to that harbor for cargoes. The rail route will be short from Cincinnati, Louisville and St. Louis, and though there cannot be much traffic in the other direction, when rates are maintained as well as they have been for the past year, even a moderate business of this kind would make a substantial addition to the profits of the Chesapeake & Ohio Railway. The greatest obstacle to securing it is that there is no great grain market in the Ohio valley, and the roads in that valley are chiefly controlled by the Baltimore & Ohio and the Pennsylvania railroads, so that to a very great extent the production of the valley is local traffic to them. This will be partly remedied by roads to the Ohio River recently constructed.

As this road is looked upon by many as a "trunk line," and actually does now, with no rail connection to the West, get some share of trunk-line traffic, carrying merchandise from New York, and grain, etc., to it from Cincinnati, and even from Chicago, it will be interesting to examine its traffic and its rates, and see how they compare with those of other leading roads, and how the traffic grows. The number of tons carried one mile, the average rate per ton per mile, and the average freight traffic (ton-miles) per mile of road have been:

Year.	Ton-miles.	Av. rate.	Ton-miles per mile of road.
1873-74.....	60,275,536	1.50	134,585
1874-75.....	68,160,096	1.48	152,796
1875-76.....	97,633,570	1.20	225,482
1876-77.....	116,971,680	1.10	270,142
1877-78.....	152,897,160	0.98	351,465
1878-79.....	167,833,065	0.88	384,057
1879-80.....	330,219,551	0.88	526,818

We give the traffic per mile to enable us to compare

the traffic with that of other roads, not to show progress, because that is shown sufficiently by the total ton-mileage, the length of road having been substantially the same every year. The ton-miles per mile of road on several roads have been:

Road.	Ton-miles.	Road.	Ton-miles.
Ches. & Ohio.....	528,818	C. & Ind. Cen.....	683,000
N. Y. Central.....	2,504,141	Boston & Prov.....	634,600
Penna.....	1,955,800	C. & Rock Island & P.....	546,110
P. C. & St. L.....	1,827,276	Chicago & Alton.....	529,256
Eric.....	1,806,941	Missouri Pacific.....	521,680
Fort Wayne.....	1,714,460	Chi. & N. W.....	389,000
Lake Shore.....	1,471,800	Hannibal & St. Jo.....	383,000
C. C. & Ind.....	1,025,852	At. Miss. & Ohio.....	230,363
Boston & Albany.....	1,003,191	Eastern of Mass.....	215,274
Michigan Central.....	897,080	Chi. Mil. & St. P.....	201,200
Av. of all N. Y. roads.....	840,000	Vicksburg & Meridian.....	70,000

In studying this average freight traffic per mile, we should distinguish between those roads which are all, or nearly all, main line, and those which have a vast mileage of branches with much lighter traffic. We have marked with a star those roads in the above table which are substantially all main line. How much effect this may have may be seen from the fact that the Michigan Central, which reports its through traffic separately, while having an average of 897,000 ton-miles per mile for its whole system, had no less than 1,954,394 ton-miles of through traffic alone per mile on the 284 miles of main line from Detroit to Buffalo. The Chesapeake & Ohio is substantially all main line. Its traffic is very much greater than that of any other Southern road reporting, and is positively large, but we see that it has still a great way to go to reach even the density of traffic of the immediate connections of the trunk lines, like the Lake Shore, the Michigan Central, the Fort Wayne and the Pan-Handle.

It is not necessary, however, for it to get such a traffic in order to prosper, and, as we have seen, it already has a much larger traffic than that of many prosperous, dividend-paying roads. That the Chesapeake & Ohio has not yet reached that position is due to two causes: first, its traffic is now chiefly of the kind (through freight and coal) that bears very low rates, an unusual proportion of which is absorbed by expenses; that is, it is a business on which the margin of profit is, and doubtless always will be, very small, so that the only way to make a large amount of profit on it is by getting an enormous amount of it, as the trunk lines do; the other cause is that the capital of the Chesapeake & Ohio is extraordinarily large for a new road—\$68,420 of stock (of three classes) per mile, and \$65,000 of bonds. Since the reorganization, however, the burden of fixed charges has been made comparatively light, especially for a few years, by making part of the coupons of the larger part of the bonds payable in stock.

There are two issues of which the coupons are partly so payable, \$15,000,000 of 6s "Series B," interest payable May and November, and \$10,122,500 of 6s "Series A," interest payable January and July. Below is given the interest payable on these in money and stock for successive fiscal years, counting the November coupon as belonging to the fiscal year ending a month earlier, as it must be paid from the profits of that year:

Series B.		Series A.	
In 1st pref. stock.	In Cash.	In 2d pref. stock.	In Cash.
1880-81.....	\$900,000		\$607,350
1881-82.....	450,000	\$450,000	607,350
1882-83.....	300,000	600,000	607,350
1883-84.....		900,000	607,350
1884-85.....		900,000	\$202,450
1885-86.....		900,000	202,450
1886-87.....		900,000	607,350

The aggregate of the interest on all the other bonds now outstanding is about \$200,000, and by adding this to the cash payments of any year, we may find the total burden of interest charges for that year. It will be but about \$200,000 for the current year, but the following year will be as much as \$650,000, or about \$80,000 more than the net earnings of the current fiscal year, and in 1883-84, when full interest on Series B bonds becomes payable in cash, it will be \$1,100,000, or about twice as much as the net earnings of the last fiscal year. Regarding the Series A bonds, the safety of the company can never be endangered by them, because the cash payments are to be made only when there is a sufficient surplus of income: the interest will be paid in stock if there is not money enough.

Thus it is absolutely required that the company should double its net income within the next three years, in order to meet the obligations already incurred. This may seem like a tremendous task, but it is hardly so great as it looks, and if there is the development of local industries along the road which now seems probable, will be very easily accomplished, to say nothing of the contribution of through traffic which the Western connection will bring, which is sure to be considerable, though it may lack much of giving the road a trunk-line traffic. There have been constructed recently several roads in Ohio, from the north and

northwest to the Ohio River, whose interest it will be to interchange traffic with this road, and an immediate and very considerable growth of traffic may be expected, while there can hardly be any doubt that in the future there will be a truly enormous traffic on the road, contributed by manufacturing and mining industries on its line.

WIND PRESSURE.

The failure of the Tay Bridge has had the effect of leading engineers all over the world to investigate more thoroughly the effect of wind on such structures. But, considering its importance, it is strange how little accurate knowledge there is relating to the subject. If any one will seek for information in the text books, he will find that in nearly all of them the only data given are either contained in a table generally attributed to Smeaton, or consist of deductions therefrom. As a matter of fact, the table is not Smeaton's, but was given by him in a paper read before the Royal Society in 1759. This was republished in 1814, in a volume of "Miscellaneous Papers, by John Smeaton, C. E.," of which there is a copy in the library of the American Society of Civil Engineers. Of this paper Smeaton says:

"The following table was communicated to me by my friend, Mr. Rouse, and appears to have been constructed with great care from a considerable number of facts and experiments; and having relation to the subject of this article, I here insert it as hesent it to me, but, at the same time, must observe that the evidence for these numbers, where the velocity of the wind exceeds 50 miles an hour, does not seem of equal authority with that of 50 miles an hour and under. It is also to be observed that the numbers in Column 3 are calculated according to the square of the velocity of the wind, which, in moderate velocities, from what has been before observed, will hold very nearly."

Table Containing the Velocity and Force of Wind, according to their Common Appellations.

VELOCITY OF THE WIND.		Perpendicular force on one ft. and in pounds avoirdupois	Common appellations of the force of winds.
Miles in one hour.	Feet in one second.		
1.....	1.47	0.005	Hardly perceptible.
2.....	2.93	0.020	Just perceptible.
3.....	4.40	0.044	
4.....	5.87	0.079	Gentle, pleasant wind.
5.....	7.33	0.123	
10.....	14.67	0.492	Pleasant brisk gale.
15.....	22.00	1.107	
20.....	29.34	1.968	Very brisk.
25.....	36.67	3.075	
30.....	44.01	4.429	High winds.
35.....	51.34	6.027	
40.....	58.68	7.873	Very high.
45.....	66.01	9.963	A storm or tempest.
50.....	73.35	12.300	A great storm.
60.....	88.02	17.715	A hurricane.
80.....	117.36	31.490	A hurricane that tears up trees, carries buildings before it, etc.
100.....	146.70	92.200	

It will thus be seen that the knowledge concerning this important point, by which engineers of the present day are governed, is derived from experiments or inferences made more than a hundred years ago, not by the distinguished engineer who first gave the record to the public, but by a friend of his, and the only certificate of its correctness which the former gives is the assertion that "it appears to have been constructed with great care." At the same time his language will lead any one to infer that he was not without doubts concerning it, and he plainly asserts his doubts about "those numbers where the velocity of the wind exceeds 50 miles an hour."

That civil engineers, and especially bridge-builders, have had no more reliable data than this on which to base their calculations is not very flattering to their profession, especially if we call to mind how many structures have been blown down. It is not surprising then that a person as careful as Mr. Trautwine should say, as he does in his "Engineer's Pocket-book," that "the relation between the velocity of wind and its pressure against an obstacle placed either at right angles to its course, or inclined to it, has not been well determined; and still less so its pressure against curved surfaces."

If search is made for data concerning the velocity and force of the wind, almost any figures required can be found. Thus at the time the plans for the Tay Bridge were under investigation, and before it was built, a number of eminent engineers were called in in consultation. To Messrs. Barlow and Pole the subject of wind pressure was referred. They consulted the Astronomer Royal, who said:

"We know that upon very limited surfaces, and for very limited times, the pressure of the wind does amount sometimes to 40 lbs. per square foot, or, in Scotland, probably to more. So far as I am aware, our positive knowledge, as derived from instrumental record, goes no further; but in studying the register it is impossible not to see that these high pressures are momentary, and it seems more probable that they arise from some irregular whirlings of the air which extend to no great distance. I should say certainly to no distance comparable to the dimensions of the proposed bridge, and I think that the fairest estimate of the pressure on the entire bridge would be found by taking the mean of the recorded pressure at one point of the space for a moderate extent of time, as

representing the mean pressures in a moderate extent of space at one instant of time. Adopting this consideration, I think we may say that the greatest wind pressure to which a plain surface like that of the bridge will be subjected in its whole extent is 10 lbs. per square foot."

In this report Messrs. Barlow and Pole concurred, and said: "We may therefore safely adopt 10 lbs. per square foot as the side pressure due to the wind." Stoney in his treatise on bridges says: "The maximum force of the wind in England may be assumed equivalent to 25 lbs. per square foot of side surface exposed to its influence."

Trautwine says: "According to observations in Liverpool, in 1860, a wind of 38 miles per hour produced a pressure of 14 lbs. per square foot against an object perpendicular to it; and one of 70 miles per hour, 42 lbs. per foot. These make the pressure per square foot nearly twice as great as given in Smeaton's table."

Rankine gives the greatest intensity of the pressure of the wind heretofore observed in Britain at 55 lbs. per square foot.

Mr. Scott Russell asserts that 40 lbs. per foot is about the maximum force which it is necessary to reckon upon in constructing roofs, etc.

The commissioners appointed by the British Board of Trade to report on the Tay Bridge accident give the maximum wind pressure observed at Birdstone, in 1871, at 90 lbs. per foot; although there seems to be a little doubt about the trustworthiness of this observation. They say the greatest pressure actually recorded was 50 lbs. in Calcutta, but there are numerous examples of pressure of 40 lbs., and between 40 and 50 lbs.

Perhaps the most valuable contribution to our knowledge of the subject is a paper by Mr. C. Shaler Smith, C. E., which was read at the last meeting of the American Society of Civil Engineers. He has made a number of observations on the effects of storms, and deduced the pressure by calculating the force required to overturn different objects which were thus affected by the wind. The pressure he gives are: 93 lbs. at St. Louis in 1871, locomotive overturned; 84.3 lbs. at St. Charles, Mo., in 1877; 58 lbs. at Marshfield, Mo.; 27 lbs. at Havre de Grace, Md., in 1866; 26 lbs. at Decatur, Ala., in 1870, besides several other cases at different places.

"Müller's Physics" contains a statement that at Guadeloupe cannon were hurled from the top of the parapets of the batteries by a hurricane.

In "Eastman's White Mountain Guide" it is said that the velocity at the top of Mount Washington is sometimes 100 miles per hour; and in another place the maximum speed has been given at 180 miles per hour. The latter would be equivalent to a pressure of 145.8 lbs. per square foot, which is so great that some confirmatory testimony is required to establish it.

It will be seen from these data that the observations of wind pressure are still far from being trustworthy.

What adds to the confusion is the fact that we are in almost absolute ignorance of its effect on surfaces of different size, form and positions. For example, Mr. Trautwine says: "The pressure against a large surface is probably proportionately greater than against a small one;" whereas, in a discussion before the American Society of Civil Engineers, Mr. Ashbel Welch said: "It is assumed that the pressure on a flat surface, at right angles to the wind, is equal to a column of air of the same base as that surface, and of the height that would give a falling body the actual velocity of the wind. * * * The air rebounds in divergent lines, and thus a base is pressed upon broader than the surface of the solid, and yet supported by it. * * * Hence the pressure against the solid flat surface, especially if a narrow one, is always greater than that deduced from the rule in question."

Our knowledge of the effect of wind on surfaces of different forms is almost equally, or perhaps more, ambiguous. Rankine gives the wind pressure against the side of a cylinder as about one-half of the total pressure on a diametrical plane of that cylinder. We all know from experience that the effect of a violent wind is much more likely to be disastrous if exerted against the concave side of an umbrella than it is when blowing against the convex side. In fact, a standard anemometer acts upon this principle. Whether the pressure of wind acting diagonally against a square column is equal to that exerted on a plane at right angles to its direction, whose width is equal to the diagonal or side of the square, probably no one knows. We are in equal ignorance regarding the effect of wind acting against a perforated plane, such as the side of a close lattice bridge, and know very little more what allowance to make for the effect on the wind on the leeward truss or trusses, or how much of the superficial surface of a bridge is exposed to wind pressure. If the wind always blew directly at right angles to the trusses, the surface

exposed to it would be quite different from that subjected to pressure when the direction of the currents is at an angle of say 45 degrees to the side of the bridge.

Sir John Hawkshaw, the distinguished engineer, has been appointed one of a committee to investigate the effect of wind pressure for the British government. He has addressed a letter to the Secretary of the American Society of Civil Engineers asking for any information relating to the subject that Americans may be able to supply. A circular letter was there fore sent out by the Society to prominent engineers and bridge-builders for such information. The answers indicate that the practice in this country is to allow as a minimum wind pressure 29 lbs., and as a maximum 50 lbs. per square foot. Average practice is 30 to 40 lbs. It is not apparent, though, how much of the superficial surface of the windward truss is taken for the exposed surface, nor what pressure is allowed for leeward trusses. Mr. Smith, in his paper, already referred to, gives as the results of experiments with the Rock Island pivot span that the resistance to wind by the structure was that due to rather more than 1.8 times the exposed surface of one truss. He does not say what he regards as the exposed surface.

Allowance must, of course, be made for the surface of a train of cars on a bridge, and this is given at 10 square feet, or 300 lbs. pressure, per lineal foot of bridge, and is generally regarded as a moving load. The specifications of the Erie road require an allowance of 150 lbs. of wind pressure per lineal foot for the top, and the same amount for the bottom chords, and 300 lbs. for the train in the plane of the roadway. The lateral braces are then calculated to bear a tensile strain of 15,000 lbs. per square inch.

The commissioners of the Board of Trade who investigated the Tay Bridge accident reported that a pressure of from 28 to 40 lbs. per square foot is required to overturn railway carriages. Mr. C. Shaler Smith calculated that loaded passenger trains will be overturned by a wind pressure of 31½ lbs., and loaded freight trains by 56½ lbs. per square foot. He further says: "If the braces are proportioned at 15,000 lbs. per square inch, with a wind pressure of 30 lbs. per square foot, that they will still be within the limit of elasticity at the moment when the train is blown from the track in either case. Destruction of the span will then take place, if at all, from the effects of derailment; to resist which greater strength in the wind bracing will be of no value." In other words, he says that there is no use in proportioning wind-bracing to resist a strain greater than that required to overturn the heaviest trains. So long as the exposed surface of the bridge is no greater than that of the train, or the effect of the wind on that surface is no greater, this conclusion seems to be sound; but if, as would be the case on a long span and deep truss, the exposed surface of the bridge is from one and a half times to twice that of the train, then it might not be safe to adopt this inference. It is improbable that most bridges will be occupied by trains at the moment of maximum wind pressure. If the bridge surface is one and a half times that of a train, a pressure of 50 lbs. per square foot would exert as much strain on it empty as 30 lbs. would when it is loaded. It is true that a wind pressure which would overturn a train would probably destroy a bridge by derailment of the latter, but at the same time, if such a structure encountered a tornado having a force equal to the one reported by Mr. Smith at St. Louis, 93 lbs. per square foot, and if at that moment, as is most probable, there was not a train on it, the bridge would be safe if it was calculated to resist a pressure of 56 pounds on train and structure, whereas it would not be if it could resist only 30 or 40 pounds. In other words, the wind bracing should be made strong enough to resist, when unloaded, the severest storms known, even though a less violent storm would derail the train.

The only safe conclusion to arrive at, though, is that our knowledge of the subject is still very imperfect, and, under the circumstances, the safest course is to err in giving too much lateral strength to bridges rather than too little.

The New York Central.

We have already had reported the gross earnings from each principal source of the New York Central & Hudson River Railroad for the year ending with September last, and compared them with those of previous years, showing that they were the largest in the history of the company. Now, in advance of the full annual report (which we expect to be able to give next week), we have a statement of the working expenses, the disposition of the net earnings, and some important deductions from the operations of

the year. The working expenses, it is shown, did not increase in the same proportion as the receipts; the increase in the latter was 16.8 per cent., amounting to \$4,779,330, while in the expenses it was but 10.7 per cent., amounting to \$1,726,821, so that the increase in net earnings was no less than 21.8 per cent., amounting to the great sum of \$3,052,508. The total net earnings after paying all fixed charges were equivalent to \$11.82 per share of stock, against \$9.49 earned the previous year, and after paying the 8 per cent. which this company has divided regularly every year of its existence there was left a surplus of \$3,427,706. Nearly the whole of this was expended in additions to the property, half for cars and locomotives and the other half chiefly for terminal facilities in Buffalo and New York. Of course this great investment increases the earning power of the company, which in this way greatly strengthens the position of its stock, and its power in controlling rates on all through traffic and a very large share of the local business of the state of New York. If this policy is followed of restricting the dividends to 5 per cent. whatever the earnings may be, and devoting any surplus to adding to the property the effect is likely to be, that the New York Central will be the great obstacle to high railroad rates in this country; it will always be able to earn its dividends with low rates, and beyond a moderate amount would have no use for larger profits. Then the stock of the company would assume the nature of a first-class bond, and would rank accordingly.

The earnings of this road from the chief sources, its working expenses, and its net earnings for the past nine years have been as follows, Harlem earnings and expenses being included for the years before as well as those after the consolidation:

Year.	Passenger.	Freight.	Other.	Gross earnings.	Working expenses.	Net earnings.
1871-72	\$7,772,262	\$17,533,534	\$3,111,401	\$28,417,197	\$18,108,820	\$10,308,377
1872-73	8,147,692	20,647,168	3,401,180	\$32,196,040	19,574,047	\$12,621,993
1873-74	7,497,357	20,346,725	3,874,514	\$31,718,600	19,588,298	\$12,130,302
1874-75	7,276,848	17,880,701	3,850,000	\$29,007,549	17,292,108	\$11,715,441
1875-76	6,782,957	17,593,265	3,900,356	\$28,276,578	16,124,172	\$12,152,406
1876-77	6,576,816	16,424,317	3,777,953	\$26,779,086	14,946,102	\$11,832,984
1877-78	6,222,455	16,045,840	3,841,770	\$26,110,065	16,135,077	\$9,974,988
1878-79	6,953,102	18,271,250	4,173,321	\$29,397,673	16,124,729	\$13,272,944
1879-80	6,611,150	22,100,000	4,364,788	\$33,075,938	17,940,804	\$15,135,134

We see by this that what has made the gross earnings of the last year larger than ever before is the freight business. Although the passenger earnings are 11 per cent. more than in 1879, and larger than in any other year since 1876, they are much smaller than in any of the years previous to 1876, and nearly a fifth smaller than in 1872-73—the end of which coincided with the panic. As there has been but a slight decrease in the average rate, this must be due to a decrease in passenger traffic from those years so long past. And, in fact, the passenger mileage last year was 832,220,000, against 864,356,000 in 1873, a decrease of nearly 10 per cent., during which time the freight traffic has increased almost exactly 100 per cent. In passenger traffic, therefore, there is plenty of room left to grow. Since 1879 there has been an increase of 14.3 per cent. in passenger traffic, and of 11.3 per cent. in freight traffic, so that the growth of the former (for the first time in the history of the road) has been the greatest. In amount the growth of passenger traffic from 1879 to 1880 was one-fourth more on the Central than on the Erie, and the growth of freight traffic 60 per cent. more. The Erie's passenger traffic was 54½ per cent. and its freight traffic 67½ per cent. of the Central's. The Erie's coal traffic decreased largely in 1880; the Central's, we understand, increased largely.

The expenses, we have seen, increased last year 10.7 per cent. over 1879, and they have exceeded those of 1874-75, and have been exceeded only in the three years previous. But comparing the traffic of the two years 1872 and 1880, we find that there has been an increase of 2½ per cent. in passenger and an increase of 330 per cent. in freight—say an increase of 150 per cent. in total traffic; yet this has been carried with a slight decrease in working expenses.

The statement published gives the receipt, expenses and profit per ton and per passenger per mile, which we give below, with those of the five previous years, in cents:

	Per Passenger-mile.			Per Ton-mile.		
	Receipt.	Expense.	Profit.	Receipt.	Expense.	Profit.
1875	2.14	1.36	0.78	1.37	0.30	1.07
1876	1.91	1.09	0.82	1.05	0.71	0.34
1877	2.07	1.14	0.93	1.01	0.70	0.31
1878	2.01	1.28	0.73	0.914	0.590	0.324
1879	2.05	1.19	0.86	0.796	0.541	0.255
1880	1.99	1.26	0.73	0.870	0.540	0.330

It is notable here that the average passenger rate was reduced in 1880, and at the same time the expense increased, so that the profit per passenger was 15 per cent. less, which more than made up for the increase in passenger traffic, so that the total passenger profits were less than in 1879 even, when the passenger traffic was the lightest the road ever had. Again, the cost per ton per mile is the same as last year, but the average rate was 9.3 per cent. higher—the first

turn in this direction that has ever occurred. Now it will be interesting to see how much of the increase in profits was due to the increase in freight traffic and how much to the increase in rates. We will find that at the 1879 rate the freight traffic of 1880 would have brought in but \$20,311,002 (\$2,011,442 more than in 1879), instead of the actual freight earnings of \$22,100,000. Thus \$1,888,974 of the freight receipts and, the expense per ton per mile having been the same in both years, an equal amount of net earnings were due to the better rates, which, however, though higher than in 1879, were lower than in any other year. Little more than half of the increase, therefore, was due to the increase in the traffic; the rest to the increase in the average rate.

As the full report will require further analysis, we postpone further discussion until it has been published.

Foreign Railroad Notes.

On the 10th of September, at the Porta Nuova station in Turin, Italy, a white marble tablet was set up, containing bas relief portraits of George and Robert Stephenson, and the following inscription:

"To George and Robert Stephenson, who, by perfecting the locomotive, opened new ways to commerce and to the brotherhood of nations. Dedicated by the Italians, on the fiftieth anniversary of the wonderful invention."

We fear that it did not ever occur to any American to set up such a memorial, and yet Americans more than other people have profited by the invention. In the next million-dollar passenger station, which will have at least a hundred thousand dollars worth (or cost, rather) of ugly ornament, we suggest that room be found for some recognition of the great engineers.

The third International Safety Congress was held in Florence, Sept. 23 to 29. The previous meetings have been held in Paris and Marseilles. Its object is "the diffusion of knowledge of the results of experience and tests made in different countries with regard to the improvement and increase of whatever serves to guard against accidents by land and by water, and to lessen as much as possible injury done by them."

Of the twelve questions proposed at this congress the first regarded railroad accidents, while the others concerned accidents by other vehicles, by vessels, by inundations, fires, wounds, poisons, etc.

The first question was: What are the commonest railroad accidents, what is the cause of them, and what provision is required to prevent them?

The person appointed to report on this question, Dr. Vitali, designated color-blindness as a cause of many railroad accidents, and recommended that employes should be examined periodically as to their color sense and visual power, especially after sickness, wounds or severe shocks, and also in the case of men who smoke or indulge in alcoholic drinks, as he says that experience shows that excessive use of these affects visual power. Further, care should be taken as to the hearing power of employes, which is said to be reduced progressively among certain classes. Further, it was claimed that men who have served as soldiers are less likely to neglect their duties, and such men are designated as specially fit to be taken into railroad service. The Congress recommended a more extended use of continuous brakes, and of the Saxby & Farmer interlocking system, and further experiments with regard to inter-communication between the passengers and the train-men.

The Institution of Civil Engineers (of England) has awarded "a Telford Premium" to Joseph Miller Wilson, M. Inst. C. E., of Philadelphia, for his description of "a Bridge over the Monongahela River at Port Perry, Pa., U. S. A."

The London Engineer says that "the Pullman cars usually have, in addition to very strong under frames, floors of solid oak as much as 7 in. thick." This will be news to Mr. Pullman, probably.

The Nickel Plating Co., of Stockton, England, has engaged to nickel-plate the bright parts of seven locomotives intended for a leading English railroad.

On the 2d of November last the Berg & Märk Railroad, of Prussia, let contracts for 14,000 tons of steel rails, which the Bochum Works took at \$40 per ton at the works; at the same time the Breslau & Schweidnitz road let a contract for 8,100 tons, which the Hoesch and the Bochum Works offered at \$40.25 and \$40.50, delivered at Stettin, which is equivalent to but \$36 at the works; at the same time the Krupp Works bid for 3,000 rails to be used in England, and in competition with English works Krupp offered them at \$30 a ton and carried off the contract. It appears then that the German works will sell to foreigners for \$10 a ton less than they charge to German roads.

The Prussian Minister of Public Works reports that in consequence of the acquisition of the large number of private railroads this year, 26 different constructions of road which the private companies had projected could be dispensed with, and that thus an expenditure of more than \$21,000,000 has been avoided, while securing all the facilities for transportation that these constructions would have given.

Last September there was an exhibition of work done by apprentices in the shops of the Berg & Märk (state) Railroad, at Witten on the Ruhr. Apprentices in twelve different shops contributed to the exhibition, and the government distributed 37 prizes—two of 50 marks (\$12), five of 20, and 20 of 10 marks.

The French government has withdrawn the bill before

Parliament authorizing it to purchase the system of the Orleans Company—one of the six great companies of France—which has been a leading question in France for some time. It was generally supposed that the measure would be adopted, and many regarded it as the first step towards a general state system of railroads in France.

The Latest Central Vermont Decision.

The Vermont Supreme Court, after holding it under consideration for over a year, has at last rendered its decision in what is known as the Langdon suit, which was brought in the interest of the Central Vermont Company and for the avowed purpose of settling finally the status of the various creditors and claimants of the roads operated by that company as trustee and manager. The last decision rendered by the Court was in 1877, when it denied the petition of the trustee for leave to sell the roads included in the trust to satisfy their debts, and the present decision, while in terms upholding and confirming the former one, in effect reverses it and places this whole case on a different footing. The opinion of 1877 held that there had been, in a strict legal sense, no receivers of the Vermont Central and Vermont & Canada roads since 1864, and that the trustees and receivers constituted under the compromise decree of 1864, and their successor and present representative, the Central Vermont Company, must be held to be merely agents and managers by common consent for the parties in interest, and not in any sense officers of the Court of Chancery as receivers usually are. Incidentally, if not directly, the Court then placed the claims of the original owners of the property prior to those of the creditors holding the bonds and other obligations of the trustees. The Court now, while expressly declaring that its former decision was correct in principle and that the present one is built upon it, holds in brief that:

The Vermont Central bondholders must be held to have surrendered and subordinated their liens to those of the equipment bonds, the so-called Vermont & Canada guaranteed loan, and the other securities of the trustees, inasmuch as they consented through their chosen representatives to the creation and issue of these securities. As to the floating debt of the trust the Court does not absolutely decide, but directs an investigation into the amount and character of the claims composing it before making final order. On the principles laid down, however, it is probable that a large part of it will be accorded priority.

The Vermont & Canada Company, in like manner, is held as having consented to the creation of the trust debt and as now estopped from contesting its validity. As in the former decision this company's claim for rental is recognized as having the first claim upon the earnings of the trust; but that claim is expressly limited to the net earnings, and the Court holds that interest upon the trust bonds is part of the necessary expenses, which may be deducted before fixing the amount of the net earnings—which will leave very little to satisfy claims for rental.

It is noticeable in the opinion that the Court everywhere abstains carefully from saying anything that may be held as approving or confirming the acts of the trustee. Its declaration of the validity and prior lien of the trustee's debts is based entirely on the consent of the parties in interest to the creation of those debts, and still intimates that the so-called compromise decree of 1864 derives its authority not from the mere formal and ministerial act of the Chancellor in approving and recording it, but from the consent and agreement of the various parties affected by it. The Court apparently wishes to clear itself of all responsibility for the trustees and their actions, putting it entirely upon those whose agents the trustees were; saying in effect that they have so far trusted and supported those agents that they cannot now plead any act of theirs as a defense against their creditors.

This decision is probably the beginning of the end of one of the most curious episodes of the history of railroads in this country. We have not space now to give even a brief sketch of the history of this remarkable case, and it has before been pretty fully treated. What will be the next movement toward the end we do not know; probably matters will remain in their present condition for a time, at any rate until the investigation of the floating debt, which will be a matter of months, is completed.

In a word, the original owners of the property now find themselves practically deprived of all interest in it after twenty years of litigation. The Vermont Central bondholders see their lien subordinated to a mass of later debt, which probably exceeds the entire value of the property. The Vermont & Canada stockholders find that their lease—probably the most stringent railroad lease ever drawn in this country—is no protection, and they will have to see the continued use of their road by others without compensation, while the trustees continue in full management and control of the property, of which their very liberal construction of their powers has effectively deprived the beneficiaries of the trust. The Court has probably stated fairly and correctly the law in the case, but this is one of those cases in which, to the lay mind, law and justice are not by any means synonymous terms.

Record of New Railroad Construction.

This number of the Railroad Gazette contains information of the laying of track on new railroads as follows:

Chicago, St. Paul, Minneapolis & Omaha.—The North Wisconsin Division has been extended from Chandler, Wis., north by east to Cable, 40 miles.

East Line & Red River.—Extended from Black Jack Grove, Tex., west to Greenville, 18 miles.

Southern Pacific.—Extended east to Deming, N. M., 12 miles.

Toledo, Delphos & Burlington.—Extended from Marion, Ind., west to Greentown, 15 miles. Gauge, 3 feet.

Long Valley.—Completed from Lamoka, Pa., north to the Long Valley coal mines, 7 miles.

Richmond & Allegheny.—Extended southeast to Buchanan, Va., 26 miles.

This is a total of 118 miles of new railroad, making 5,967 miles thus far this year, against 3,043 miles reported at the same time in 1879, 2,263 miles in 1878, 2,019 miles in 1877, 2,276 miles in 1876, 1,393 miles in 1875, 1,844 miles in 1874, 9,680 miles in 1873 and 7,160 miles in 1872.

PENNSYLVANIA RAILROAD EARNINGS IN NOVEMBER (all lines east of Pittsburgh and Erie) show an increase of 11½ per cent. over the corresponding month of last year, but the expenses being 22 per cent. greater, there is an increase of but 8½ per cent. (\$47,627) in net earnings. The earnings, expenses and net earnings in November for five years have been:

	Gross earnings.	Expenses.	Net earnings.
1879.....	\$3,405,281	\$1,654,391	\$1,810,888
1878.....	3,050,457	1,593,373	1,456,084
1877.....	2,990,102	1,605,851	1,384,250
1876.....	3,131,997	1,785,548	1,346,449
1880.....	3,574,913	2,180,897	1,394,016

The very large increase of expenses this year over any previous November will be noticed. It is doubtless due to large expenditures properly chargeable to capital account. The net earnings are nearly the same as in 1878, and smaller than in either of the two previous years.

For the eleven months ending with November the earnings, etc., for three years have been:

	Gross earnings.	Expenses.	Net earnings.
1878.....	\$29,031,438	\$14,705,632	\$12,225,806
1879.....	31,168,353	18,440,868	12,727,485
1880.....	37,712,244	22,293,471	15,500,773

Compared with last year there is an increase of 21 per cent. in earnings, of 20.4 per cent. in expenses and 21.9 per cent. in net earnings. The increase in net earnings on these lines is \$2,783,288; the gain in the net earnings of the lines west of Pittsburgh over the rentals and other liabilities is \$1,801,193. This addition of \$4,584,481 to the profits of the Pennsylvania Railroad Company is equivalent to \$6.66 per share of stock.

THE CANADA SOUTHERN declared its first dividend last Tuesday, the amount being 2½ per cent. The year's business shows an increase of 24.1 per cent. in gross earnings, a decrease of 2½ per cent. in working expenses, and an increase of no less than 142 per cent. in net earnings, the latter having been very light in 1879. The earnings were at the rate of \$9.232 per mile, against \$6.561 in 1879, when the 67 miles of the Chicago & Canada Southern (which earned very little) were included. There is probably no road in the country that gains so much, proportionally, as the Canada Southern by the maintenance of through rates, as its traffic is nearly all through. The surplus of net earnings over fixed charges was at the rate of \$6.12 per share, against \$1.06 in 1879. The payments for construction and to reduce floating debt (accounts and bills payable) were more than the amount divided.

THE LAKE SHORE & MICHIGAN SOUTHERN makes a magnificent showing for the year 1880. The statement (partly estimated) for the calendar year presented at the meeting of the board last Tuesday, when the half-yearly dividend was declared, showed an increase of 22.6 per cent. in gross earnings, of 16.5 per cent. in expenses, and of 31.1 per cent. in net earnings, the amount of the increase in net earnings being \$1,973,000. After paying all fixed charges the profits are at the rate of \$11.24 per share of stock, against \$7.24 last year. The rate of profit is very nearly as great as on the New York Central. As on that road, only 8 per cent. has been divided. The cost of 1,500 freight cars and of 7,000 tons of steel rails is included in the working expenses of the year. Hereafter the company is to pay its dividends quarterly, which will make the stock more desirable for investors.

THE MICHIGAN CENTRAL statement of earnings and expenses for 1880, made at the dividend meeting this week, shows an increase over 1879 of 23.9 per cent. in gross earnings, operating expenses and net earnings alike, and the amount of the increase in net earnings is \$649,000. The surplus over fixed charges is \$9.42 per share this year against \$5.87 last. After paying the 8 per cent. dividend, the surplus went chiefly to construction, and for settling the last claims on account of the Jackson collision, for which \$70,000 were spent. The cost of 870 new freight cars and 4,700 tons of steel rails was charged to expenses. Dividends are to be paid quarterly hereafter.

MR. GEORGE TICKNOR CURTIS, the eminent lawyer, has written a rejoinder to Judge Black's letter to the New York Chamber of Commerce, in which he denies that the state has any property rights in railroads built and worked by corporations. Mr. Curtis insists that none of the recent decisions of the Supreme Court have upset the doctrine of the Dartmouth College case, that a charter is a contract binding on the state, and that when the charter says that the company may fix its own rates, the state cannot reduce them.

Mr. Sellers on the Metric System for the Mechanical Draughtsman.

The following communication, dated at Boston and signed "F. B.," is taken from the *Engineering News* of Dec. 4:

In his paper recently read before the Mechanical Engineers, and printed in the *Engineering News* of Nov. 20 and

27, Mr. Coleman Sellers has contributed to the metric discussion a valuable explanation of the difficulties which attend any change of standard in the machine shop, whether to or from the metric system, and of the way those difficulties have been met in the recent very successful introduction of the metric system into Germany, matters which were popularly understood before only in a general way. The subjects of draughting and computing, however, he so befores that a few simple words of commentary are in order.

He mentions seven scales which he says emphatically are the only ones we can use for metrical drawings; and complains that these are not enough. "The jump from one-half to one-fifth size is unfortunate. If we could conveniently quarter the whole size we would have an increased area section, a matter of much moment." Then why, in the name of reason, should not we do so? We can use a scale of 25 per cent. full size, as conveniently as we can use a 25 cent piece or a 2½ dollar piece in federal money. Does not Mr. Sellers know that our currency is decimal? Well, take what he does know; the metric system is nothing if not decimal; and the graduations of any metric scale, which on one drawing represent certain dimensions, on another drawing perfectly represent ten times those dimensions. Now, one of his seven metric scales is one twenty-fifth (or 1/25, to speak decimally), which he expressly states may be constructed; with that in his hand he can use it just as well for a scale of 1/5. This is a second stepping-stone in his chasm, between 1/25 and 1/5. If he wants a third stepping-stone he can take 1/10. The marks for 8mm. and 4mm. are just as plain on any rule as the mark for 2mm.; and like it they can be taken to represent 1 centimeter, 10 centimeters, 1 meter, 10 or 100 meters, or 1 kilometer. Here comes in the advantage over the old practice; for when a quarter of an inch is taken to represent an inch, as it is by the machinist, he wants it divided by successive bisections; when it is taken to represent a foot, as it is by the architect, he wants it divided duodecimally; when it is taken to represent ten feet, as it is by the surveyor, he wants it divided into ten parts; so that three different draughting scales are desirable for the use even of the commonest of all scales.

Mr. Sellers claims it as an advantage of the inch dispensation that it gives a multiplicity of scales. He mentions, for instance, that we can use 1/4 and also 1/2. What earthly good is there in having two scales so nearly alike? If one of them is big enough or small enough, the other will be also, in any ordinary case. These needless variations simply depend upon the permission of several incongruous methods of subdivision, which is a perpetual source of annoyance, despite Mr. Sellers' assurance that they "lead to no confusion." Probably every reader has a painful recollection of the interconversion of 16ths and decimal fractions of the inch, let alone duodecimals.

Mr. Sellers presents a series of customary scales having the peculiar merit that each is twice as large as the next; the following series of standard metric scales possesses the same merit:

0.025 0.05 0.1 0.2 0.4 0.8

Yet he italicizes the assertion that the manifest advantage of the inch series "admits of no dispute."

About computation, Mr. Sellers' remarks are still less adequate, though not so audacious. He compares the multiplication of 1.5 m. × 1.5 m. × 3 m. with that of 5 ft. × 5 ft. × 10 ft., which would be fair if we had decimalized the foot and abandoned the inch. For a real comparison with what is now in use, let him take 1 1/5" × 1 1/5" × 3 ft., and see whether his carpenter will reckon it in his head. He says again: "I must confess I see no difference in favor of hunting up in books the specific gravity of matter, or in looking for the weight of matter in pounds per cubic inch, or foot, or yard." Such humility deserves assistance; the difference is, dear sir, that not all of those items are found in English tables; sometimes only one of them is given. If you find the weight per cubic foot when you want the weight per cubic inch, you have to divide by 1,728; if you find the weight per cubic inch when you want the weight per yard, you have to multiply by 46,656. In the metric tables, on the other hand, the specific gravity is at once the weight in kilos. per liter, the weight in grams per cubic cent., and the weight in metric tons per cubic meter.

Mr. Sellers declares, as if it were a conclusive argument: "I have yet to see the example of a metric-educated draughtsman working in millimeter calculations on an inch-measured machine." Of course the metric man is not such a fool as to suppose that the inch and the millimeter can be mixed up with advantage.

He speaks also of the want of metric hand-books in the English language containing formulas and various data. There is no occasion for anxiety on that score; when the demand becomes active, the supply will doubtless be forthcoming.

The chief point of vantage appears to be the very serious difficulty of changing the Wm. Sellers, or Franklin Institute, or United States standard of screw-threads; but the force of this argument was somewhat broken on the day after it was uttered by the discussion that took place in the American Society of Mechanical Engineers, showing that the screw-threads now in use in this country are far from conforming to any system. Mr. Forney, of the *Railroad Gazette*, is quoted as giving this illustration:

"A railroad, not long since, ordering some thousand cars, specified that the bolts and nuts were to be of the Franklin Institute standard. When the cars were delivered it was found that the nuts and bolts were not interchangeable with those already in use, except the larger nuts on the smaller bolts. Investigation showed that the works which built the cars had purchased new taps and dies, said to be standard for that especial work; but, on comparison, it was found that these did not agree with certain other standards."

Mr. Sellers confines himself avowedly to the machine-shop, shutting his eyes to what is going on outside of it. In the matter of weights and measures, which is directly connected with an endless variety of human activity, it might prove advantageous, even in regard to his own specialty, to take a broader view.

The New Pennsylvania Station in Philadelphia.

The designs for the exterior of the new passenger station of the Pennsylvania Railroad Company at the corner of Merriek and Filbert streets indicate that it will be one of the most imposing structures in the city, and the plans for the interior assure passengers that nothing will be left undone which can add to their comfort and convenience. The company owns the entire square, which fronts 306 ft. on Merriek street, and runs back 123 to Fifteenth street. The station will occupy the corner of Merriek and Filbert streets, with a front of 193 ft. on Merriek, so that it will cover very nearly two-thirds of the square. It will be of four stories, with a tower over 100 ft. in height on each corner. The style of the architecture is Gothic, and the material entering into the construction of the outer walls pressed brick, ornamental brick and terra cotta—the latter furnished by the Perth Amboy Terra Cotta Co., and of a color similar to fire brick. The first story will be faced with Pennsylvania blue stone. The use of terra cotta will admit of a great deal

of simple ornamentation in the columns, and the different floors will be marked by lines of fancy brick.

The first floor will be occupied by the inward and outward baggage rooms and the ticket offices, of which there will be two, entirely distinct from each other—one for local and the other for through passengers—an arrangement that will materially shorten the delays of local passengers, who can be attended to four or five times as fast as through passengers, who are generally in search of information both as to routes and time. Eighty-four feet of the width of the building will be given up to three passage ways, two 20 ft. wide and one 24 ft. Passengers arriving in carriages will drive directly into the building, and alight in front of the main stairway leading to the waiting-rooms on the second floor. They will procure their tickets and the baggage will be deposited in the baggage-room at the corner of Fifteenth and Filbert streets, which will be arranged so as to be approached from three sides. Two stairways 11 ft. wide will lead to the second floor, but two elevators will be running constantly to accommodate those who find even a single short flight of stairs too much. The lower story will be 16 ft. high. Arriving passengers will leave the station on the opposite side, descending to the street by a single broad flight of stairs into a lobby 30 ft. by 32, from which they will reach Merriek street through the southern entrance.

The two stairways divided by the ticket-office converge at a landing half way up, and lead to the general waiting-room, through which all passengers will pass on their way to the trains. This is a spacious room, 51 ft. in width by 80 in length, with a lofty ceiling of glass, the altitude of the room being 44 ft. An abrupt turn to the left on entering the general waiting-room will conduct ladies to the ladies' waiting-room, which, with the dining-room, will occupy the entire front of the second floor. The ladies' room is of the same length as the general waiting-room, but 29 ft. in width, with a private room opening out of it on the Filbert street corner, 26 by 16. A door from the ladies' room leads to the dining-room, which is of the same width, and only 8 ft. shorter than the general waiting-room. Entrance to the dining-room will be had from the general waiting-room through the restaurant at the further end, opposite the main entrance. In the restaurant, 23 ft. wide by 51 long, will be a lunch counter, with small tables opposite. The news-stand and telegraph offices will be on either side of the entrance. The height of the second story is 31 ft., the general waiting-room being two stories in height. The third and fourth stories will be mainly devoted to the offices necessary for the company's officials, and they will be reached by a gallery running round the waiting-room. The kitchen will, however, occupy a large part of the space toward Market street, and a private elevator will connect it with the ground floor. Back of the restaurant will be a large barber shop 16 by 34 ft., and over that will be bath-rooms, where passengers will find all the conveniences of a room in any hotel, and will thus be spared the inconvenience of going to a hotel for no other purpose than to take a bath and make a change of clothes. Over the restaurant will be private dining-rooms.

Four entrances with wide doors will afford the means of communication with the train shed, and the lobby between the doors and the gates being 40 ft. An ornamental iron bridge across Fifteenth street will mark the head of the train house, and the rear end of the trains will come to the eastern line of the street. The train shed itself will be somewhat like that at West Philadelphia, with eight tracks, but close together under one roof with two arches. The shed extends one square from Fifteenth to Sixteenth street, and the walls are 15 ft. in height and the centre of the roof 50 ft. high. The exterior of the shed will be of faced brick, but the interior will be finished with ornamental brick.

The plans drawn for the station were designed by Wilson Bros. & Co., under the direction of Joseph M. Wilson, Engineer of Bridges and Buildings of the Pennsylvania Railroad, and the work of construction is proceeding under the supervision of Wm. H. Brown, Engineer of Maintenance of Way. The cost will be about a quarter of a million, exclusive of the ground. It is probable that the first of May will see the work completed.—*Philadelphia North American*.

Twenty-Four O'Clock.

We have several times published articles advocating the numbering of the hours consecutively from midnight to midnight to designate railroad time, and an article was published a few years ago by Sanford Fleming, Chief Engineer of the Canada Pacific, proposing something of the kind. Now the *Scioto Gazette*, of Chillicothe, O., has invented the plan over again, and advocates it in the following language:

The railroad managers of the country are the live, active men of the day, and are not as a rule those who carry a dead weight because their fathers did. Yet, in their time-cards, they all carry an incubance that positively confuses the uninitiated. Not one man in fifty can take an ordinary time-card, and in the multiplicity of a. m.'s and p. m.'s, dittoing as they do from both the top and bottom of the card, figure out the time from New York to St. Louis or Chicago without becoming confused and uncertain, and from New York to San Francisco it becomes a positive impossibility with many more. Not only this, but the railroad companies pay thousands of dollars every year for the setting up of these letters by printers, and for the cardboard and paper on which they are printed, besides making their time-cards large and cumbersome.

It is within the power of the companies to get rid of these letters. They now furnish the standard time to the whole country. There is no more reason why there should be two 12 o'clocks in one day, than there is why there should be two twelve-mile posts on a twenty-four mile railroad. Practically, the day commences at midnight, consists of twenty-four hours, and ends the next night at midnight. By acknowledging that fact and dividing the day into hours and minutes numbered consecutively up to twenty-four hours, the record of time would be greatly simplified. Thus: Instead of saying 12.15 a. m. we would give the time as fifteen minutes, written, .15, showing that it was the fifteenth minute of the day. Instead of saying 12.30 a. m., .30, or in the same manner for any number of minutes up to 1 o'clock, which hour would be written 1.00 instead of 1.00 a. m. The same rule would be followed up, omitting the a. m. and p. m. up to 12.59. What we call 1 o'clock p. m., under the new system we would call thirteen o'clock, or thirteenth hour; 1.30 p. m. would be 13.30; 2 o'clock p. m., 14.00, and so on up to twenty-four.

The system might sound a little odd at first, but the ear would soon become accustomed to it, and it has the positive convenience that any figures which may be written can designate but one time of the day, and that is certain as soon as you see and hear them, without searching or inquiring whether it means a. m. or p. m. The only disadvantage it has is that all the watches and clocks are adjusted and figured for the twelve-hour system, but with a person not absolutely stupid at figures it would be no trouble to make the calculations mentally, or watch and clock dials could have the additional figures marked in an inner circle to those already on the dial. But it would be but a little while until all the numbers would

be definitely fixed in the mind, and to say eighteen o'clock would convey a certain meaning to the mind just as much as when we now say six o'clock p. m.

As we said before, the railroad managers of the country have the matter of time in their own hands. They fix it for the country, can introduce this system, and greatly simplify their time-tables, besides reducing the cost of printing them, and give them in more compact form. We have suggested such a change to a number of our railroad friends, and, while they all appear to wonder that time-cards cannot be readily understood by the public, they quickly concede that the system above described would be simpler and not liable to be misunderstood, and that the adoption of it by one of the great through lines of the country would bring it into general use at once. The companies, too, could count upon the active co-operation of all the printers in making the public familiar with the change; for those a. m.'s and p. m.'s cause no end of swearing every time a time-card is set up in every office in the land.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings will be held as follows:
Pittsburgh, Titusville & Buffalo, special meeting, at the office in Philadelphia, Jan. 20, to vote on the question of consolidation with several companies organized to build extensions of the road.
Philadelphia & Reading, annual meeting, in Musical Fund Hall, Philadelphia, Jan. 10, at noon.

Dividends

Dividends have been declared as follows:
Boston & Lowell, 2 per cent., semi-annual, payable Jan. 1.
Old Colony, 3 per cent., semi-annual, payable Jan. 1.
Chicago, Rock Island & Pacific, 1½ per cent., quarterly, payable Feb. 1. Transfer books close Dec. 30.
Philadelphia, Wilmington & Baltimore, 4 per cent., semi-annual, payable Jan. 3.
Lake Shore & Michigan Southern, 4 per cent., semi-annual, payable Feb. 1.
Michigan Central, 4 per cent., semi-annual, payable Feb. 1.
Canada Southern, 2½ per cent., payable Feb. 1. This is the first dividend paid by the company.

Foreclosure Sales.

The *Washington City, Virginia Midland & Great Southern* road was sold in Alexandria, Va., Dec. 20, the sale including the entire line, subject to certain leases and contracts, as noted last week. One bid of \$4,000,000 was made by J. F. Burke, of Philadelphia, but the road was sold for \$5,600,000 to the Purchasing Committee of bondholders, consisting of Messrs. R. T. Baldwin, J. Wilcox Brown and Robert Garrett.

ELECTIONS AND APPOINTMENTS.

Alabama Central.—Mr. S. B. Hubbard, Jr., has been appointed General Freight and Passenger Agent. He has been connected with the Richmond & Danville road.

Chesapeake & Ohio.—At the annual meeting in Richmond, Dec. 16, the following directors were chosen: Williams C. Wickham, John Echols, Richmond, Va.; John Castree, A. S. Hatch, Elias Higgins, C. P. Huntington, Jesse Hoyt, Abiel A. Low, A. E. Orr, E. D. Tournier, Ezra Wheeler, New York.

Chicago, St. Paul, Minneapolis & Omaha.—Mr. T. W. Teasdale has been appointed General Agent, in place of W. H. Dixon, resigned. Mr. Teasdale was recently Assistant General Passenger Agent of the Missouri, Kansas & Texas.

Columbia River & Puget Sound.—The directors of this new company are: A. A. Denny, J. N. Dolph, Bailey Gatzert, T. F. Oakes, M. Romain. Office at Seattle, Wash. Ter. The company is controlled by the Oregon Railway & Navigation Company.

Denver, Western & Pacific.—The directors of this new company are: J. Duff, H. A. W. Taber, John L. Routt, H. R. Wolcott, E. F. Halleck, G. W. Clayton, J. A. Cooper, D. H. Moffatt, Jr., Denver, Col.; John C. Short, New York.

Hosack Tunnel Dock & Elevator Co.—At the annual meeting in Boston, Dec. 20, the following directors were chosen: F. L. Ames, J. R. Brewer, Robert Codman, C. W. Cotting, W. H. Lincoln. The board elected F. L. Ames, President; Charles K. Cobb, Clerk; C. W. Cotting, Treasurer.

Illinois Railroad Commission.—Judge John Moses, of Scott County, has been appointed Secretary of the board, in place of Col. Charles Hamilton, resigned.

Jacksonville, Pensacola & Mobile.—Mr. Wm. O. Ames has been appointed General Freight and Passenger Agent, and James D. Hollister Master of Transportation, in place of Edgar Vliet, resigned.

Lake Shore & Michigan Southern.—Mr. W. H. Canniff has been appointed Superintendent of the Lansing Division, with office in Lansing, Mich. Mr. Canniff has been Road-Master on the road for some time, and is Secretary of the International Road-Masters' Association.

Memphis & Little Rock.—Mr. W. Flack has been appointed Superintendent of Transportation, in place of W. E. Smith, recently promoted to be General Manager.

Memphis, Paducah & Northern.—The United States Circuit Court has appointed Henry W. Smith Receiver in the foreclosure suit lately begun. Mr. Smithers was Receiver of the road when it was the Paducah & Memphis, and is President of the present company.

Missouri Pacific.—The following circular announces officially an appointment already noted:

"James D. Brown is appointed Assistant General Passenger and Ticket Agent of this company, with office at St. Louis."

Mr. Brown has been for several years General Passenger Agent of the Missouri, Kansas & Texas.

New York, Pennsylvania & Ohio.—The following circular is dated Dec. 15: "The following arrangement of divisions will go into effect Jan. 1, 1881:

"The Eastern Division will comprise the road between Salamanca and Kent and the Franklin Branch. A. L. Dunbar, Division Superintendent.

"The Western Division will comprise the road between Kent and Dayton. T. A. Phillips, Division Superintendent.

"The Mahoning Division will comprise the road between Cleveland and Sharon, the Sharon Railway, the Liberty & Vienna Railroad, and the Niles & New Lisbon Railway. J. M. Ferris, Division Superintendent."

The Eastern Division includes the old First and Second and the Western Division the old Third and Fourth divisions.

Plymouth.—At the annual meeting last week the following directors were chosen: James Boyd, Christopher Hubner, John Slingluff, Edwin Swift, L. V. Williamson, W. S. Wilson. The road is leased to the Philadelphia & Reading.

Provincial & New England All-Rail Line.—Capt. Charles Spear has been appointed General Agent of this line, with office in St. John, N. B. Capt. Spear was formerly in the steamboat business, being manager of lines between Boston, Bangor and Portland, and for some time in California. For several years he has been on the Eastern Railroad in Boston.

Sioux City & Pacific.—Mr. J. E. Marsh has been appointed Car Accountant, with office at Missouri Valley, Iowa.

Southern Maryland.—This company has recently been re-organized with the following directors: John M. Broom, St. Mary, Md.; Charles E. Coates, Baltimore; W. W. W. Wood, Washington; W. H. Lafferty, Camden, N. J.; Thomas T. Butcher, George H. Fairman, B. F. Folsom, W. P. Henszey, J. H. Linville, D. B. McKibben, Joseph Trimble, Philadelphia. The board elected J. H. Linville, President; M. H. Hoffman, Secretary; B. F. Folsom, Treasurer. The offices are in Philadelphia.

South & North Alabama.—At the annual meeting in Montgomery, Dec. 18, the following directors were chosen: E. P. Alexander, H. Victor Newcomb, H. C. Murrell, Josiah Morris, Thomas Joseph, W. O. Baldwin, John W. Burr, B. S. Bibb, Boling Hall, L. W. Sloss, John T. Milner, Luke Pryor, George A. Washington. The road is controlled by the Louisville & Nashville.

Texas, Santa Fe & Northern.—The officers of this new company are: President, Charles J. Lowry; Vice-President, Bernard Seligman; Secretary, Charles H. Gildersleeve; Treasurer, Lehman Spiegelberg. Offices in Santa Fe, New Mexico.

PERSONAL.

—Mr. Edgar Vliet has resigned his position as General Freight and Passenger Agent and Master of Transportation of the Jacksonville, Pensacola & Mobile road.

—Hon. J. K. Graves, of Dubuque, who was the leading promoter and President of the Iowa Pacific Railroad Company, and also prominent in the Chicago, Dubuque & Minnesota, is much spoken of as the Republican candidate for Governor of Iowa at the next election.

—Mr. James M. Stone, one of the first projectors of the Massachusetts Central Railroad, and President of the company from its first organization until two years ago, died at his residence in Charlestown, Mass., Dec. 19, aged 63 years. He served six years in the Massachusetts Legislature and was Speaker of the House two years.

—Mr. Henry R. Worthington, who died in New York, Dec. 17, aged 64 years, was widely known as a hydraulic engineer of long experience and high standing, and an extensive manufacturer of pumping machinery. He was a member of the American Society of Civil Engineers, and Vice-President of the Society of Mechanical Engineers.

—Mr. John P. Jackson, a well-known lawyer, and counsel for the Pennsylvania Railroad in New Jersey, died at his residence in Newark, N. J., Dec. 17, aged 44 years. He was a son of the late John P. Jackson, for many years Vice-President and Superintendent of the New Jersey Railroad, and a brother of F. Wolcott Jackson, General Superintendent of the United New Jersey Division of the Pennsylvania Railroad.

—Mr. E. E. Barney, the well-known car-builder, President of the Barney & Smith Manufacturing Company, died at his residence in Dayton, O., Dec. 17. Mr. Barney had been engaged in the building of cars for many years, and his work is on almost every road in the country. Of late years he had given much attention to the growth and use of the catalpa tree for timber, and his pamphlets on that question have received much attention.

—Mr. G. W. Cushing, formerly Superintendent of Machinery on the Missouri, Kansas & Texas Railway, has recently visited New York. Owing to the consolidation of this line with other roads, Mr. Cushing's occupation for the present is gone. His experience, not only on the road he has recently been connected with, but before that on the Northern Pacific road, and earlier still on the Chicago & Northwestern, and his well-known ability are quite certain, however, to open the door for future occupation in his specialty at an early date.

TRAFFIC AND EARNINGS.

Grain Movement.

For the week ending Dec. 11 receipts and shipments of grain of all kinds at the eight reporting Northwestern markets and receipts at the seven Atlantic ports have been, in bushels, for the past eight years:

Year.	Northwestern receipts.	Northwestern shipments.	Atlantic receipts.
1873.....	2,625,508	1,594,247	1,499,457
1874.....	2,247,072	1,391,161	1,391,514
1875.....	2,129,850	742,915	1,835,211
1876.....	2,732,511	1,380,132	2,246,464
1877.....	2,808,557	1,172,719	2,463,069
1878.....	3,834,457	1,453,904	3,097,492
1879.....	3,611,180	809,023	2,707,037
1880.....	4,852,388	1,181,301	3,699,096

Compared with the corresponding week of previous years, there is an increase of more than a third in the Northwestern receipts and the Atlantic receipts over last year, and an increase of 39 per cent. in Northwestern shipments. The latter, however, were not heavy, and were exceeded in 1878, 1876, and even in 1873.

Compared with previous weeks the receipts of the Northwestern markets were 22.7 per cent. less than the week before; the shipments of these markets were 18 per cent. less than the week before, and the smallest since February, and the Atlantic receipts, with one exception, were also the smallest since February.

Of the Northwestern receipts, Chicago had 44.1 per cent., St. Louis, 16.2, Milwaukee, 12.6, Toledo, 10.2, Peoria, 8.8, Detroit, 7, and Cleveland 1.1 per cent. The Toledo receipts are very much smaller than usual.

Of the Atlantic receipts New York had 36.3 per cent., Philadelphia 24.4, Baltimore 21.4, Boston 11.4, Portland 3.3, New Orleans 3.1, and Montreal 0.1 per cent. New York's receipts are the smallest since early in March; Portland's are unusually large for that place; Philadelphia's are the largest for five weeks; Baltimore's the smallest for nine weeks.

Exports from Atlantic ports for five consecutive weeks have been:

	Dec. 15.	Dec. 8.	Dec. 1.	Nov. 24.	Nov. 17.
Flour, bbls.	153,302	1,32,909	101,826	142,442	112,022
Grain, bush.	2,046,707	2,469,577	3,603,963	4,112,718	4,092,963

Thus the exports remain very light. Receipts and shipments at Chicago and Milwaukee for the week ending Dec. 15 were:

	Receipts.	Shipments.
Chicago.....	1880. 2,136,830	1879. 1,640,567
Milwaukee.....	1880. 551,820	1879. 544,500

There is an increase of 30 per cent. in the receipts and 21 per cent. in the shipments of Chicago, and an increase of 1½ per cent. in the receipts and 52 per cent. in the shipments at Milwaukee. The shipments are very much lighter than they were a short time ago, but the receipts keep up well.

For the first three weeks of December the receipts of flour, grain and hogs at Chicago and Milwaukee, and the percentage of increase or decrease in comparison with the corresponding period of 1879, have been:

	Chicago.			Milwaukee.		
	Flour, bbls.	Grain, bush.	Hogs, No.	Flour, bbls.	Grain, bush.	Hogs, No.
1877...	246,931	3,075,506	538,566	180,533	1,845,093	74,871
1878...	249,641	5,316,940	652,931	188,902	2,390,552	112,158
1879...	327,325	5,289,839	664,622	194,249	1,854,908	80,347
1880...	424,038	7,464,360	592,077	212,451	1,909,943	87,206

Compared with last year there is an increase at Chicago of 29.7 per cent. in flour, 41.1 in grain and a decrease of 10.9 per cent. in hogs; and at Milwaukee an increase of 9.4 per cent. in flour, of 3 per cent. in grain and a decrease of 2.3 per cent. in hogs.

Railroad Earnings.

Earnings for various periods are reported as follows:

Eleven months ending Nov. 30:

	1880.	1879.	Inc. or Dec.	P. c.
Ala. Gt. Southern	\$582,252	\$360,644	I.	61.608
Cairo & St. Louis	375,213	238,785	I.	57.1
Denver, So. Pk & P.	1,690,399	766,681	I.	121.718
Det., Lan. & No.	1,090,315	997,507	I.	92.808
Ind., Bloom. & West.	1,118,460	1,054,689	I.	63.771
Lake Erie & West.	1,206,222	620,441	I.	585.781
Marq., Hough. & Oa.	781,506	538,589	I.	242.997
Mem., Pad. & No.	106,128	144,640	I.	51.488
Mo., Kan. & Texas	3,804,368	2,963,365	I.	28.4
Nash., Chatt. & St. L.	1,873,453	1,615,225	I.	258.328
Paducah & E'town	366,550	304,112	I.	62.438
Pennsylvania.....	37,712,246	31,166,355	I.	6,545.891
Net earnings.....	15,508,773	12,725,485	I.	2,783.288
Wisconsin Central	1,035,328	744,771	I.	290.557

Ten months ending Oct. 31:

	1880.	1879.	Inc. or Dec.	P. c.
N. Y., Lake Erie & W.	\$15,965,240	\$13,585,040	I.	\$2,370,200
Net earnings.....	6,312,001	4,039,751	I.	2,272,250

Month of October:

	1880.	1879.	Inc. or Dec.	P. c.
Houston & Tex.	\$478,099	\$46,565	I.	\$71.534
Central.....	300,223	242,955	I.	57.288
Intercolonial.....	156,169	129,390	I.	26.770
N. Y., Lake Erie & W.	1,890,910	1,713,698	I.	126.212
Net earnings.....	886,505	715,723	I.	170.782

Month of November:

	1880.	1879.	Inc. or Dec.	P. c.
Ala. Great Southern	\$61,155	\$49,600	I.	\$11.555
Cairo & St. Louis	39,642	22,647	I.	16.995
Denver, So. Pk & P.	87,333	139,077	D.	51.744
Det., Lan. & No.	105,061	92,835	I.	12.226
Gal., Har. & San Antonio	143,095	135,716	I.	7.379
Ind., Bloom. & West.	96,622	92,279	I.	4.343
Lake Erie & West.	90,929	67,869	I.	32.000
Marq., Hough. & Oa.	34,202	29,183	I.	5.019
Mem., Pad. & No.	22,917	19,915	I.	3.002
Mo., Kan. & Tex.	371,079	387,087	D.	16.008
Nash., Chatt. & St. L.	182,087	174,245	I.	7.842
Net earnings.....	18,307	14,766	D.	4.299
Paducah & E'town	37,557	31,131	I.	42.916
Pennsylvania.....	3,574,913	3,131,997	I.	47.627
Net earnings.....	1,394,075	1,346,448	I.	3.5
So. Pacific, No. Div.	96,000	96,886	I.	29.114
Wisconsin Central	113,020	82,079	I.	30.941

First week in December:

	1880.	1879.	Inc. or Dec.	P. c.
Minn. & St. Louis	\$17,418	\$12,467	I.	\$4.951
Chi. & Eastern Ill.	\$29,847	\$18,758	I.	\$11.089
Denver & Rio G.	\$8,601	\$9,353	I.	\$9.248
No. Pacific, Eastern Div.	44,400	24,073	I.	20.327
St. L., I. Mt. & So.	189,900	184,729	I.	5.171
St. P., Minn. & Man.	79,500	36,700	I.	42.800

Week ending Dec. 10:

	1880.	1879.	Inc. or Dec.	P. c.
Great Western.....	\$102,162	\$100,148	I.	\$2.014
Week ending Dec. 11:				
Grand Trunk.....	\$204,367	\$189,269	I.	\$15.098

Coal Movement.

Coal tonnages are reported as follows for the week ending Dec. 11:

	1880.	1879.	Decrease.	P. c.
Anthracite.....	463,101	554,977	91,876	16.6
Semi-bituminous.....	69,251	97,955	28,704	29.3
Bituminous, Penna.....	51,200	61,440	10,240	16.7
Coke, Penna.....	33,012	37,709	4,787	12.1

In anthracite trade continues active and prices are generally well maintained. The demand for shipment westward is reported unusually large.

Coal shipments over the Seattle & Walla Walla road and by sea from Seattle, Wash. Ter., in November, were 11,066 tons. For the eleven months ending Nov. 30 the shipments were: 1880, 116,502; 1879, 123,510; decrease, 7,008 tons, or 5.7 per cent. A large business is expected in December.

The official accountant's statement of anthracite tonnages for November and the eleven months, differing somewhat in form from the weekly statements, is as follows:

	November.	1879.	Eleven months.	1880.	1879.
Phila. & Reading.....	647,547	672,167	5,526,833	6,892,067	
Lehigh Valley.....	465,545	424,631	4,024,979	4,039,802	
Central, of New Jersey.....	354,107	342,966	3,193,252	3,518,215	
Delaware, Lack. & Western.....	363,144	366,426	3,240,198	3,527,691	
Dela. & Hud. Canal Co.	310,311	271,972	2,461,095	2,743,897	
Pennsylvania R. R. Co.	184,342	144,505	1,714,356	1,562,482	
Pennsylvania Coal Co.	127,595	115,398	1,032,448	1,337,588	
N. Y., Lake Erie & Western.....	40,070	47,506	364,620	446,538	
Total.....	2,492,661	2,385,601	21,558,381	24,068,280	

For the month there was a total increase of 107,000 tons, or 4.5 per cent.; this is the first month this year showing an increase. Five companies show gains for the month and three losses, all small in amount. For the eleven months the decrease was 2,509,899 tons, or 10.4 per cent. The Pennsylvania Railroad Company alone shows a gain for the eleven months, though the Lehigh Valley tonnage is substantially the same as last year.

Crops.

The Agricultural Department estimates make the wheat crop of Oregon for 1880 12,920,000, which is one-half more than the crop of 1879. An Oregon authority reports that there are now in store in the Willamette Valley alone

about 8,900,000 bushels. The crop was a failure in that valley last year.

The Department estimates the yield of corn this year about equal to that of last year; but there is a material reduction in Indiana and Illinois, and a heavy one in Missouri, Kansas and Nebraska, owing to drought. Of states west of the Mississippi, Iowa alone reports an increase in production.

A Chicago-Havana Freight Line.

The Chicago & Eastern Illinois Railroad announces in Chicago the following rates by the Southern Dispatch Fast Freight Line from Chicago, via Pensacola, to Key West and Havana:

From Chicago to	First class.	Second class.	Third class.	Fourth class.	Fifth class.	Sixth class.
Key West, Fla.	\$1.02	\$1.42	\$1.22	\$1.02	\$.95	\$.95
Havana, Cuba.	1.72	1.52	1.32	1.12	1.05	1.05

	A	B	C	D	E	F	G	H
Key West, Fla.	85	80	80	70	85	1.55	2.80	95
Havana, Cuba.	85	80	78	70	85	1.60	2.30	95

The Green Line classification applies.

Council Bluffs Live Stock Business.

At the Union Stock Yards in Council Bluffs, during the five months from July 1 to Dec. 1, the receipts of sheep, hogs and cattle were 124,012 head, against 115,245 head for the corresponding period of last year, showing an increase of 7.6 per cent. They were apparently all delivered by the Union Pacific, which is expected to have earned \$482,430 by carrying stock to these yards.

Business of the Port of Buffalo.

The Buffalo Commercial Advertiser of Dec. 14 says: "The marine tonnage of the port of Buffalo for the season just closed was larger than that for any preceding year since 1836. The aggregate is 5,995,746 tons, which represents 10,308 clearances and arrivals. In four seasons only have these figures been exceeded, namely, in 1862, 1863, 1864 and 1866. In the first three an abnormal condition of affairs existed on account of the war and the closing of all the Southern transportation routes. In our local department to-day we print a detailed statement of arrivals and clearances at this port for this season, with comparative statements, which will be of special interest to those engaged in transportation affairs.

"The comparative statement of the rates of freight paid by lake shows more forcibly than anything else how seriously the marine interests were affected by the depression following the panic of 1873, and how great an improvement has taken place. As a matter of convenience to our readers we compile from it the following exhibit, giving the season-rate of freight on wheat from Chicago to Buffalo for ten years, and also the highest rate obtained in each year.

	Season-rate on wheat, cents.	Highest-rate on wheat, cents.
1871	7.8	18.0
1872	11.1	19.0
1873	14.0	14.0
1874	7.8	9.0
1875	3.5	6.8
1876	2.9	5.0
1877	3.7	6.0
1878	3.1	7.0
1879	4.7	8.5
1880	5.7	8.5

"The seasons of 1874, 1875, 1876, 1877 and 1878, were terribly severe on owners. The vessel that paid expenses for those years, to say nothing of profits, was the exception. But with 1879 came an improvement which continued through 1880, the effect of which is seen in much higher average rates. Another fact is brought forward prominently by the above exhibit which deserves more than a passing notice. It will be observed that in 1871-3 the highest rates ranged from 14 to 19 cents a bushel, while neither in 1879 nor 1880 did it exceed 8½ cents. The more general introduction of steam and the tow-barge system accounts for this. Formerly adverse winds would keep vessels back for days, and sometimes for weeks at a time. During these delays the fortunate craft that happened to be in port was able to command fabulous rates. With steam, however, vessels come and go with regularity regardless of the wind, and the current of trade is kept more uniform."

RAILROAD LAW.

Liability of Railroad Company for Injury from Defect of Sleeping-Car Company's Car.

Mr. Justice Harlan, of the United States Supreme Court, in the case of the Pennsylvania Company, plaintiff in error, vs Joseph E. Roy, delivered an opinion containing many points of interest:

June 5, 1876, Roy purchased at the office of the Pennsylvania Company in Chicago a first-class ticket from Chicago to Philadelphia over that company's line, and a sleeping-car ticket issued by the Pullman Palace-Car Company for the route between the same cities. He took the train the same day, going into the section of the sleeping car corresponding to his ticket. Next morning, upon the invitation of a friend traveling upon the same train, he entered the sleeping car in which that friend was riding, and while conversing with him the upper berth of the section in which they were sitting fell. Thereupon the porter of the sleeping car came at once and put up the berth, saying it would not fall again. Shortly thereafter the berth fell a second time, striking Roy upon the head, injuring his brain, incapacitating him from the performance of his usual avocations, and necessitating medical treatment. Action was brought by Roy in the Supreme Court of Cook County, Illinois, against the Pennsylvania Company, the Pittsburgh, Fort Wayne & Chicago Railroad Company, and the Pullman Palace-Car Company, but it was subsequently dismissed against all the defendants except the Pennsylvania Company, and then removed for trial into the Circuit Court of the United States for the Northern District of Illinois, where a judgment for \$10,000 in favor of Roy was rendered.

Justice Harlan, in his decision, sustained the Court below in charging the jury that the defendant, having offered in their presence to prove that the car in which the plaintiff was injured was not the car or the actual property of the defendant, but was the property of another corporation, he instructed them, as a part of the law in the case, that if the car composed a part of the train in which the plaintiff and other passengers were to be transported on the journey, and the plaintiff was injured in that without any fault of his own, and by reason either of the defective construction of the car or by some negligence on the part of those having charge of the car, then the defendant is liable. The undertaking of the railroad company was to carry the defendant in error over its line, in consideration of a certain sum, if he elected to ride in a first-class car, with the privilege, nevertheless, expressly given in its published notices, of riding in a sleeping-car, constituting a part of the carrier's

train, for an additional sum paid to the company owning such car.

As between the parties before the Court it was not material that the sleeping-car in question was owned by the Pullman Palace-Car Company, or that such company provided at its own expense a conductor and porter for such car, to whom was committed the immediate control of its interior arrangements. The duty of the railroad company was to carry the passengers over its line. In performing that duty it could not consistently, with the law and the obligations arising out of the nature of its business, use cars or vehicles whose inadequacy or insufficiency for safe conveyance was discoverable upon the most careful and thorough examination. If it chose to make no such examination or to cause it to be made, if it elected to reserve or exercise no such control or right of inspection, from time to time, of the sleeping-cars which it used in conveying passengers, as it should exercise over its own cars, it was chargeable with negligence or failure of duty. The law will conclusively presume that the conductor and porter assigned by the Pullman Palace-Car Company to the control of the interior arrangements of the sleeping-car in which Roy was riding when injured, exercised such control with the assent of the railroad company. For the purposes of the contract under which the railroad company undertook to carry Roy over its line, and in view of its obligation to use only cars that were adequate for safe conveyance, the sleeping-car company, its conductor and porter, were, in law, the servants and employees of the railroad company, and their negligence in the performance of their duty was the negligence of the railroad company.

Justice Harlan also held that it was an immaterial circumstance that Roy, when injured, was not sitting in the particular sleeping-car to which he had been originally assigned. His right, for a time, to occupy a seat in the car in which his friend was riding was not, and under the facts disclosed could not, be questioned.

Liability for Carelessness of Employee.

In the Lake Shore & Michigan Southern Company, appellant, against Lavelly, the Ohio Supreme Court decides as follows:

1. In an action brought by an employee of a railroad company against it, to recover for injury sustained while in the discharge of his duty, the negligence charged was the moving of a car under which the plaintiff was working, without notice or warning. The proof showed that the negligence in not giving notice or warning of the moving of the car was attributed to the foreman, under whose control the plaintiff was working, and not to those engaged in moving the car.

Held: That the case was not one of a failure of proof under § 133 of the code, but, at most, of variance under §§ 131 and 132.

2. It is the duty of a railroad company to make such regulations or provision for the safety of its employees as will afford them reasonable protection against the dangers incident to the performance of their respective duties.

3. A foreman was put in charge of a set of hands, whose business it was to repair freight cars while standing on the track, in a yard of the company in which trains were accustomed to be made up; it was also the duty of the foreman to participate with the hands in doing the work. While the foreman and a hand were engaged in repairing a car, and the latter was at work under the car by the order of the foreman, he was injured by the striking of the car on which he was working by another car moving on the same track.

Held: That the hand was the subordinate of the foreman, in respect to the work in which he was engaged at the time he was injured.

Second.—That it was the duty of the foreman, in putting the hand to work under the car, to use reasonable care to protect him, while thus engaged, from the danger arising from the switching of cars and the making up of trains on the same track; and for an injury resulting from the want of care the company is liable. Judgment affirmed.

Passenger on Service Train—Excessive Damages. In the Southwestern Railroad Company, appellant, against Singleton, the Georgia Supreme Court has just decided as follows, on appeal from Talbot Circuit:

1. A railroad company in this state providing sufficient trains and cars to accommodate all the traveling public over its line, has the legal right to run special trains over its road for the purpose of carrying provisions and paying its employees, and to prohibit any person from traveling on such train, and if plaintiff entered a car attached to the same, knowing its character, without the consent of the corporation or its agents, he became a trespasser.

2. If injury is sustained by such person while so wrongfully upon such special train, the fact of being on such train will be an element in determining his prudence and want of care, and the liability of the corporation.

3. If one enters a pay-train for the purpose of riding thereon, and by the rules and regulations of the company passengers were not allowed to ride on such trains, it would be his duty to leave the train as soon as he prudently could, when notified of such rule.

4. If one leaps from a train of cars moving at the rate of fifteen miles per hour, on the advice or concurrence of the conductor, his right to recover would involve the question whether he prudently used the only means provided by the company for him to get off that the course of the company permitted him to use, and also his recklessness and want of ordinary care; for if by the use of ordinary care he could have avoided the injury, the company would not be liable.

5. Where the damage alleged was the breaking of the leg of the plaintiff, resulting in permanent injury, and the plaintiff being twenty-one years of age, realizing from \$200 to \$300 for four months, and being deprived thereafter of employment, a verdict for \$14,833 is excessive. Judgment reversed.

THE SCRAP HEAP.

Railroad Equipment Notes.

The Chicago Steam Forge of Willard, Sons & Bell is turning out about 100 car-axes a day on orders.

The McDonald Forge, in St. Louis, is running full time, chiefly on car-axes.

A new steam forge company has been incorporated in Louisville, Ky., to make car-axes and other railroad forgings, besides steamboat and general work.

H. K. Porter & Co., in Pittsburgh, have just shipped another 30-in. gauge plantation locomotive to Porto Rico. They also recently shipped some narrow-gauge passenger locomotives to the Connotton Valley road; narrow-gauge engines to Tennessee, Alabama, Georgia, Mississippi and Michigan, and a standard-gauge shifting engine to Philadelphia.

The Cleveland Bridge & Car Works are building 500 coal cars for the Cleveland, Tuscarawas Valley & Wheeling road, and will soon begin on 300 box cars for the Cleveland, Columbus, Cincinnati & Indianapolis.

The Rhode Island Locomotive Works at Providence have completed three heavy engines, with 18 by 24-in. cylinders and 5 ft. driving wheels, for the Eastern Railroad.

Iron and Manufacturing Notes.

Shoenberger & Co., of the Juniata Iron and Steel Works

in Pittsburgh, are now making homogeneous steel plates for boilers, fire-boxes, and other purposes. These plates can be rolled up to 54 in. wide, and from 7 ft. long for ½ in. thickness, up to 14 ft. long for ¾ in. in thickness.

Smith, Vaile & Co., at Dayton, O., have lately shipped pumps to the Chicago, Milwaukee & St. Paul, the Wisconsin Central, the Ft. Scott, Southeastern & Memphis, the Kansas City, Ft. Scott & Gulf, the Cleveland, Columbus, Cincinnati & Indianapolis, and the Pennsylvania Company.

The new forge of W. T. & S. A. Maston at Keene, N. Y., has been started up. It is making billets to be converted into steel by the Nashua Iron & Steel Co.

A new company, known as the Conewago Iron Co., has bought the furnace formerly owned by Michael Schall, at Middletown, Pa., and will soon put it in blast.

The Wythe Iron Co. has started up its blast furnace near Wytheville, Va., and is making charcoal car-wheel iron.

Mackintosh, Hemphill & Co., in Pittsburgh, are making a number of blowing engines and a large part of the machinery for the new Pittsburgh Steel Works.

The American Sheet Iron Co. has lately been organized, and will hereafter own and operate the sheet-iron works of McClees & Co. at Phillipsburg, N. J. Mr. Wm. K. McClees is President.

Tecumseh Furnace, in Alabama, has now been in blast 5½ years and has made about 27,500 tons of pig-iron on one hearth, and is still running well. It is a charcoal furnace.

The new blast furnace at Point St. Ignace, Mich., will be ready to start up early in the spring.

The Wharton Railroad Switch Co. is building two extensive additions to its works on Washington avenue and Twenty-third street, Philadelphia, in order to accommodate increasing business.

The American Tubular Rail Manufacturing Co., of Chicago, are about to start a factory for the construction of a new patent tubular rail. The incorporators of the company are A. McKenny, President; C. H. Horine, Vice-President; R. C. Meldrum, Treasurer; and Wm. S. Brewster, Secretary.

Bridge Notes.

The Penn Bridge Works, at Beaver Falls, Pa., have on hand contracts for a bridge over the Big Black River for the Vicksburg & Meridian road; for several bridges on the Elizabeth, Lexington & Big Sandy road in Kentucky, and for a number of highway bridges in different parts of the country.

The Cleveland Bridge & Car Works are building several iron bridges for the Cleveland, Columbus, Cincinnati & Indianapolis road.

Prices of Rails.

In steel rails a good deal of business is reported. Quotations continue at \$57.50 to \$60 per ton at mill, according to time of delivery. A sale of 5,000 tons English steel rails is reported, at about \$63 per ton, delivered in New Orleans.

Iron rails are more quiet, with a fair amount of business reported, chiefly in small lots. Quotations are from \$46 per ton at mill for 56 lb. rails, up to \$50 to \$53 for light rails.

Old iron rails are still unsettled, with sales reported at \$26 to \$29 per ton in Philadelphia. Buyers are generally holding out for lower prices.

Railroad spikes are quoted \$2.65 per 100 lbs.; fish-plates, \$2.40 to \$2.50; track-bolts, \$3.75 to \$4.25, according to pattern.

The Westinghouse Air Brake Co.

Although the works of the Westinghouse Air Brake Co. now cover the block of ground bounded by Liberty, Twenty-fourth and Twenty-fifth streets, and Spring alley, to which a large addition was recently made by purchases of property on Twenty-fifth street to provide for a steady increase of the regular passenger-car-brake trade, the commencement of the freight-brake business has rendered the present great establishment totally inadequate to the enormous demands of the business. As a consequence the company yesterday, through Mr. William Roseburg, Cashier of the Bank of Pittsburgh, completed the purchase—from Messrs. Birmingham, Watson & Co.—of the large property in Allegheny City, two blocks from the Suspension Bridge, known as the Anchor Cotton Works, with the buildings thereon erected, the Corliss engine, shafting and all the appurtenances. The property on which the main works are situated is 240 by 130 ft. on Robinson and Lacock streets, and that piece on which the iron foundry and stable are situated fronts 120 ft. on Lacock street by 114 on Balkam street. The old brick cotton warehouse will be converted into an iron foundry; new offices will be erected on Robinson street, and the present office buildings will be torn down and converted into immense blacksmith and boiler shops. Some alterations will also be made in the main building to furnish increased light.

The main machine shop building will consist of nine floors about 50 by 130 ft. each; all provided with steam heating, water, gas and perforated iron pipe fire-extinguishing devices.

The engine is a model in its way, having a cylinder 24 by 48 in., with 20-foot band wheels. The establishment will admit of the employment of about one thousand workmen, and, when completed, it is believed, will be one of the most complete manufacturing establishments in the United States.

It is probable that the present works of the Westinghouse Air Brake Co., on Liberty street, will in future be occupied by a new company, about to be organized, and to be known as the Westinghouse Machine Co., and to be devoted to the manufacture of patented specialties.—Pittsburgh Telegraph, Dec. 18.

A report recently telegraphed to newspapers that the suits of the company against the Eames Vacuum Brake Co. for infringement of patents had been withdrawn is incorrect. The suits were withdrawn only in order that new complaints might be filed, made necessary by the reissue of some of the Eames patents.

Ninety Miles an Hour Between Philadelphia and New York.

At a regular meeting of the Franklin Institute in Philadelphia last week, W. Barnet Le Van read a paper on "Ninety miles in 60 minutes; or, how to accomplish the distance between New York and Philadelphia in one hour." It was a continuation of one read by him some time ago on high railroad speeds, and undertook to show the difficulties in the way of running trains at this high speed at present, and how they could be overcome. In the paper the distance in an air line between New York and Philadelphia was stated to be 80.9 miles over a comparatively level country. The existing roads are far from being straight. On the Pennsylvania line, in the 88.4 miles between Philadelphia and Jersey City there are 84 curves (15 in the 15 miles between Germantown Junction and Schenck's). The greatest length of straight track between Philadelphia and Trenton does not exceed three miles, and the greatest in the entire road does not exceed 10 miles. The Pennsylvania Railroad is not responsible for this condition of the road, but has in fact done much to straighten the line, and, notwithstanding these drawbacks, runs trains on the road at the rate of 50 miles per hour. On the Bound Brook Route there are 43 curves, one on the bridge crossing the Delaware river, which has a radius of 2,865 ft., is 1,837 ft. long, and ascends

19 ft. to the mile. The greatest stretch of straight track is from Skillman's east—44 miles. To compensate for the centrifugal force tending to throw the cars from the track when running at high speeds on curves the outer rail has to be raised. On a curve of three degrees radius the super-elevation required on a gauge of 56½ in., while less than five inches at 50 miles an hour would have to be 16 in. at 90 miles per hour. On the Pennsylvania road the super-elevation is one inch for each degree of curvature up to five inches, which is the limit. The speed must be reduced beyond that to correspond with the curve. This is one of the limitations put upon high speed on existing roadways. Mr. Le Van considered others at great length, and summed up by saying that, after a careful study of the subject, he was satisfied that a paying road could be built to be run in a straight line between New York and Philadelphia, reducing the distance about 10 miles and enabling trains to be run through in 60 minutes. One of the means of effecting this purpose would be a reduction of the dead-weight in the trains. The fast trains now running between this city and New York have generally four cars with engine and tender, weighing 232,000 lbs., or 116 tons dead load, and are 264 ft. long. For from four to eight tons of passengers carried, trains are made up weighing from 110 to 150 tons. Mr. Le Van thought it would pay to build a line so perfect in all its details as to exclude rival lines, and attract to itself all the through business. The line he pictured crossed no roads at grade, and had only two curves of 10,000 ft. radius each.

Mention was made of Mr. Le Van's ideal road, as described in his paper, in a New York daily paper the next morning as of a road which was actually to be built, and the statement is already being extensively copied, some papers going so far as to say that it is to be built "next season"—which is probably a few years ahead of time.

A Standard Pressure for Boilers.

Mayor Stokely received some days ago a petition, numerously signed, asking for the appointment of a commission to establish a standard pressure of boilers upon which to base an inspection. The petition says: "We, the undersigned, manufacturers and steam users in the city of Philadelphia, recognizing that in the city ordinance regulating the inspection of steam boilers there is no standard of pressure for boilers of different diameters and construction, petition your Honor to appoint a commission to consider the propriety of so amending the present ordinance that some standard shall be designated which shall become the law for such pressure. There are two tables of pressure used. That adopted by the United States government is based upon experiments made with American iron and methods of construction. This table is used by the Board of Supervising Inspectors of Steam Vessels, Marine and Inland. The other table is that known as Fairbairn's, and is based upon experiments made by Sir William Fairbairn, of England. These experiments were made with English iron, and it gives lower pressures than are generally used in this country. It seems important to your petitioners that some standard which will not be so low as to interfere with our industries, nor so high as to be dangerous, should be established. And we respectfully request that you act promptly, so that the early attention of Councils may be directed to this matter, so that inspectors and engineers may have some law to guide them in calculating the safe working pressures of boilers in our city." The Mayor yesterday appointed Charles T. Parry, Jacob Taylor, Coleman Sellers, Charles H. Cramp and James Hunter an advisory commission to frame an ordinance to cover the subject.—*Philadelphia North American*, Dec. 18.

Curve Signs for Trackmen.

In connection with the difficulty of maintaining the proper elevation of outer rail curves a German engineering journal proposes the following form of sign to be placed exactly at the beginning of the curve; on which is given the radius of the circular curve; the statement whether or not this is connected with the tangent by a parabolic connecting curve, the extreme height of the super-elevation, and the distance in each direction (along the tangent in one direction and along the curve in the other) within which the elevation is to be attained. Thus, in the case indicated by the printed form, the radius of the curve is 500 metres, it is connected with the tangent by a parabolic curve, the elevation attained is 90 millimetres (3½ in.), and the elevation begins on the tangent, 24 metres back from the sign and reaches its maximum on the curve, 24 metres in front of it. With this the trackmen and the inspectors have the data on hand to enable them to know whether the track at the curve is kept in proper form.

He Was on Hand.

It was dark in the depot one day last week when the evening train came in. An elderly farmer was backed up against the partition, watching in open-mouthed wonder the big, puffing engine and the yellow painted cars as they discharged their passengers, when a handsome girl in a seal-skin cloak dashed forward, and throwing herself upon the honest granger's manly breast, imprinted a kiss upon his sunburned cheek and exclaimed: "You dear old pa, I knew you would be waiting for me! And how's mother, and how's Jennie, and how's John—and oh! I'm so glad to get back—and where's my trunk—and oh! pe, you take the check and let's hurry."

The granger was old and kind of dried up, and he had never known what it was to have a wife, much less a daughter. He mistrusted the young lady in the seal-skin sack had made a mistake, but instead of stammering and hemming and hawing, he came gallantly up to the scratch, and throwing both arms around the fair creature, he made up his mind to be a father to her or die in the attempt. Imprinting a kiss on her cheek like the report of a pistol, he enthusiastically ejaculated:

"Oh, your mother's well, an' John an' Henry an' (smack), an' Jane an' Susan (smack, smack), an' Horace an' Belindy an' Calvin (smack) an' Joshua an' Peter (smack, smack) oh, they're all smart an' hearty an'—"

By the time the young lady's friends could get to her she had slid into a stony faint, and they had to lug her home in a hack, while the aged granger, as he finished the third round with her outraged young man, and sauntered out of the depot, leaving him with a bad eye and a ruptured coat, chuckled to himself:

"The old man's gittin' old an' stiff an' careless like, but when any young females wants to play any games o' cozenage, they'll find him right to time, an' I shouldn't be s'prised if it rained 'fore nine o'clock. G'lang, Kate!"—*Rockland (Me.) Courier*.

Fast Time on Freight.

Train 38 (New York, Lake Erie & Western) 40 loaded cars, mostly stock, Tim Welch conductor, engine 372, a Danforth & Cooke engine, A. J. Goble engineer, received orders at Lackawaxen last Friday morning at 2:45 to run 25 miles an hour and make Port Jervis ahead of train 12 if possible. They ran the 23 miles in 46 minutes, arriving here at 3:28. They left Lackawaxen nine minutes ahead of train 12, arriving here 10 minutes ahead of her time. This

is claimed by old conductors to be the best time made by a loaded freight train. About one-third of the distance is up grade, the balance down.—*Port Jervis (N. Y.) Gazette*, Dec. 7.

Sharp Shippers.

S. R. Howell & Co., lumber merchants in this city, have just had another set-to with the Chicago, Burlington & Quincy Railroad Company, in which they have come out second best. As is generally known, about a year or so ago this firm shipped a large amount of lumber over the Burlington from this city to Atchison, and invoiced it as salt, thereby defrauding the railroad company out of a large amount of money, as rates on salt are much lower than those on lumber. When the matter was detected, quite a storm of indignation was created among the lumber dealers in this city. The Lumberman's Exchange, to which the firm belonged, investigated the matter, the charge was proved, and the firm was censured and expelled. In order to avoid a lawsuit, Messrs. Howell & Co. settled with the railroad company for the amount the latter claimed to have been defrauded out of by the false invoicing. This experience, one would think, should have proved quite a valuable lesson to that firm, and prevented it from trying any such dishonest games again. But they do not seem to have profited by their experience, as they continued to do business in ways that are dark and with tricks that are vain. Last summer the Western railroad companies joined together and formed the Western Railway Weighing Association. Under the rules of the Association the Superintendent had to appoint weighmasters for the scales of the various roads, and all lumber shipped is weighed by them and properly inspected, and the shippers charged for actual weight. This system, it was believed, would prevent shippers from making false invoices or loading more on the cars than is charged for. While it may have had such an effect with most shippers, it does not seem to have worked well with Howell & Co. It is claimed that they succeeded by bribing one of the weighmasters of the Association, stationed at the lumber-district, to make false returns, and by this means succeeded in defrauding the railroad company out of several thousand dollars. The company would have been beaten out of much more had they not opportunely become suspicious on account of the light weights returned. They made an investigation which fully confirmed their suspicions, and Howell & Co. were compelled to acknowledge their guilt and settle with the railroad company by refunding \$2,000, on condition that "mum" should be the word. In spite of this stipulation the transaction leaked out, and a *Tribune* reporter, hearing of it, called upon the Burlington people for a confirmation of the report. They reluctantly admitted that the above facts are true, but as they have agreed, upon the payment of \$2,000 by the offending firm, to keep "mum" and not stir up an unpleasantness, they would say nothing further.—*Chicago Tribune*.

Hope for Travelers.

The widening of the ticket window at the Market street ferry is another evidence of the decline of the system of terrorism that once made the ticket agent the real autocrat and despot of a long-suffering public. Everybody knows that, next to the ordinary policeman, the ticket agents of boats and railways possess the largest proportion of the reserve gall of the communities in which they live, and the State Commissioners of Lunacy, in their late report to the Governor, gave statistics showing that ninety-two per cent. of the insane examined were originally thrown off their mental balance by the insults of some pasteboard-stamping gorilla, who was protected from retaliation by the narrowness of the aperture through which he dispensed the "guff" of his species. Every now and then we read an account of some person jumping overboard from a C. P. ferryboat, and proceed to moralize over that stereotyped old explanatory letter which the ferry officials keep on hand in blank, and which assigns the cause of the suicide to speculation in stocks. The cold facts are that the act is invariably the result of the exasperation and rage of some business man from being compelled to miss the previous boat through the intentional delay of the ticket clerk.

But, as we have just said, the power of the ticket agent is happily on the wane. At a meeting of railroad superintendents held last month in Chicago, it was resolved that, in consequence of the serious falling off in railroad travel during the past year, the ticket windows at all stations be enlarged, so that, in moments of great provocation, insulted travelers can seize the clerk by both ears and drag him sufficiently far through the window to enable the bystanders to hammer him over the head with canes and parasols. A tremendous increase of traffic is confidently anticipated this year.—*San Francisco Evening Post*.

The Baggage-master's Revenge.

When Congressman Daggett first went to Washington, two years ago, he was charged \$16.50 for extra baggage at Omaha. This angered the Congressman so that he vowed to make life a burden to every official on the Union Pacific and Central Pacific railroads. When he got to Washington, he began to ship tons and tons of *Congressional Records*, which the Union Pacific and Central Pacific railroads are obliged to carry free of charge, according to a stipulation with Uncle Sam, made when he granted them so much of his broad public domain. Daggett shipped boxes of these documents over the road, addressed to himself, and accompanied by his big frank and the words "Congressional documents, free." During the first session he sent seventeen tons of this class of matter over the road, and as soon as he reached home he sent it back again. Daggett's big boxes of "Pub. Docs." soon became notorious, and the face and figure of the Congressman were also pretty well known. Wherever he stopped he was sure to ask some of the freight agents if they had seen any of "my free freight lately." He always made himself known, and was sure to add, "You must handle those boxes gently; they contain the speeches of some of the greatest men of the nation. If you damage any of them I'll sue the road for the full value." On election day the boys got their revenge, and every mother's son of them voted and worked against Daggett. Those who ran on the Utah Division located their voting places in Nevada in time to get their work in on election day, and they raked Daggett fore and aft from sunrise to sundown.—*Carson (Nec.) Appeal*.

Daggett was not re-elected, and now he realizes that revenge is not always sweet.

OLD AND NEW ROADS.

Aberdeen & Elyton.—The city of Aberdeen, Miss., has voted to subscribe \$100,000 to the stock of this projected road, which is to run from Aberdeen to Elyton on the South & North Alabama road.

Adirondack.—It is reported that negotiations are in progress for the sale of this road to the Saratoga Lake Company, and for its completion through the wilderness to Ogdensburg.

Alabama Great Southern.—It is understood that this company has finally decided to build a line of its own on the

five miles between Wauhatchie and Chattanooga, where its trains now use the Nashville, Chattanooga & St. Louis track. A contract will shortly be let for the tunnel through Lookout Mountain, which will be required.

Baltimore & Ohio.—This company's passenger trains continue to run through to New York by the new line, but, as noted last week, the transportation of freight has been stopped by the action of the Philadelphia, Wilmington & Baltimore Company. The reason assigned by that company is that under the terms of its existing contract with the Pennsylvania Railroad Company it cannot carry the Baltimore & Ohio freight, it is added that notice has been given of the termination of that contract, but 90 days must pass before it will expire, and until then the road will not be at liberty to do the Baltimore & Ohio business.

The Baltimore & Ohio Company has issued a statement of its side of the case, in which some doubts of the existence of the contract referred to are hinted at, and strong exceptions are taken to the refusal to carry freight.

Meantime the Baltimore & Ohio has made arrangements to carry freight between Baltimore and New York by water. It is reported also that it is offering a rebate to shippers to make up for the extra time and risk of the water route.

In Pittsburgh, Dec. 16, the United States Circuit Court, on the complaint made that the Pennsylvania Railroad Company was interposing vexatious obstacles to the free use of the Junction Railroad, granted a rule against the Pennsylvania and the Junction Companies, to show cause why a writ of sequestration should not be issued against the latter and attachments against the officers of the latter because of alleged attempt in violation of the injunction which had been issued. The rule was made returnable Jan. 17, in Philadelphia.

Bellaire & Southwestern.—This company is at work preparing to extend its road from Woodfield, O., west to Caldwell and thence southwest to Beverly on the Muskingum River. The distance is about 40 miles.

Canadian Pacific.—A dispatch from Ottawa, Dec. 17, says: "The opposition members of the Dominion Parliament have issued a manifesto to the people of Canada, protesting against the ratification of the government's proposed Pacific Railway policy. It sets forth that the Ministers have withheld vital information, preventing discussion in the constituencies, and have denied the right of the people to be consulted on the scheme. It concedes that the private construction of the road, aided by grants of money and lands, under certain restrictions, is in the public interest, but that the present subsidies are not proportionate to the work performed and restrictions imposed detrimental to the country and to future settlers' claims. It strongly favors the construction of the Sault Ste. Marie Branch as giving the country two competing lines to draw the products of the north-western states through the Dominion, and urges Parliament not to sanction a measure entailing \$40,000,000 increase of the public debt, thus furnishing a pretext for excessive taxation."

Central City, Deadwood & Eastern.—This company has let the contract for building its road to Archibald McArthur, of Chicago. The line is to connect Central City and Deadwood, in the Black Hills, with the coal mines among the foot hills of that region.

Central Vermont.—The opinion of the Vermont Supreme Court, in the case of Langdon, et al., against the Vermont & Canada Company, et al., heard at Montpelier in the fall of 1879, has been filed. A summary of it is as follows:

This decision finally determines the long-disputed question as to the priorities and rights of the different classes of securities based upon the Vermont Central and Vermont & Canada railroads, and holds that the bonds issued by the receivers and managers from time to time, and known as the "trust securities," are prior in right and security to the claims of the first and second mortgage bondholders of the Vermont Central Railroad, and the stockholders of that corporation, and to the rental claims of the Vermont & Canada Railroad Company, and must be first paid.

The opinion will cover nearly 150 pages of foolscap, and is a very elaborate document. It was drawn up under the direction of the Court by Hon. Homer E. Royce, First Associate Justice, and receives the approval and concurrence of the full bench. After giving a résumé of the record history of the long chancery litigation, in which the property has been involved since 1855, and the corporate action of the companies and bondholders bearing upon it, the conclusions reached are in substance as follows:

1. The mortgage bonds of the Vermont Central Railroad Company are valid and binding obligations, but the property was placed in the hands of receivers by the decree of 1861, and these receivers have never been discharged. The bondholders elected, and procured their election to be secured by a decree of the Court of Chancery as a right, to annually choose a committee to represent them and take part and advise in the management of the property. That committee assented to the issue of the various loans known as the trust and funded loans by the receivers as receivers, and to their sale and negotiation as receivers' paper, and the bondholders, most, if not all of them, participated in the avails thereof.

They are now estopped from denying that these bonds were just what they purported to be—receivers' obligations—and as such they take precedence of the mortgage bonds, and must be first paid.

2. The stockholders of the Vermont & Canada Railroad Company stand in substantially the same position. That company is entitled to have the rent agreed upon for the use of its road paid out of the net income of the property. It procured the appointment of the receivers originally, has never taken the proper steps to have them discharged, and has suffered them, with its countenance and assent, to go on and issue and negotiate to innocent third parties these receivers' obligations. It is now estopped from denying that they are just what they purport to be, and as such they must be paid before there can be any net income out of which to pay the Vermont & Canada rent.

When one of two parties must suffer from the act of a third, the burden must be borne by the party who enabled the act to be done, and as between the Vermont & Canada Company and the first and second mortgage bondholders of the Vermont Central on the one hand, and the holders of the trust debt on the other, the latter have the superior equity and must be first paid. All the loans called "trust loans" have been authorized and negotiated with the full knowledge of and upon proper notice to the Vermont & Canada Company and the Central mortgage bondholders, and such loans are binding upon them.

Under this state of facts it is immaterial whether the parties who issued and negotiated them as receivers and managers were strict receivers or not. All parties are now estopped from denying their authority to issue them for just what they purported to be. The history, character and quality of the floating debt has not been so ascertained and presented as to justify making any order concerning it at this time. Upon the coming in of the report ordered in the mandate, the proper orders will be made. The value of the special security pledged for the payment of

the trust bonds must be ascertained and first applied to their payment, and the balance, if any, will stand upon perfect equality in the matter of enforcing payment against the *corpus* of the property. It is expected that what is now decided will result in the apportionment and distribution of the property to those entitled and end the disastrous litigation. In justice to the various chancellors who have acted in the case, it is but just to say that in the matter of authorizing the loans and contracts which it is claimed have resulted disastrously, they have never been called upon to exercise judgment, but have simply given formal sanction to the agreements of the parties interested.

The order of the court is as follows: "The *pro forma* decree of the Court of Chancery dismissing the bill is reversed and cause remanded with a mandate that it be referred to a master or masters to ascertain and report the amount due of principal and interest on all the bonds issued and negotiated by the receivers as such, or as trustees and managers, or as trustees and receivers, or as trustees and managers, and the consideration upon which they are held, the kind and value of the property pledged to secure the payment of each of the different classes of said bonds at the time it was so pledged, and its present value, the kind and value of the property purchased with the avails of the car service pledged to secure the payment of said bonds when purchased and its present value, the amount received for the car service pledged to secure them, and how the money received on account of said car service has been used and appropriated, the amount due on account of the floating debt, how, when, and under what circumstances it has been contracted, what proportion of said debt has been contracted for or has grown out of the necessary expense of running and operating and maintaining said roads and property, and when. And that upon the ascertainment of said facts a decree be entered that will secure the realization of the rights of the bondholders as herein before defined and the rights of any other of the parties as they may be determined."

Chicago, Milwaukee & St. Paul.—The bridge over the Mississippi at Sabula, Ill., is about ready for use, and the company will probably begin next week to run trains from its Dubuque Division through to Chicago over the Chicago & Pacific Division.

Chicago, Rock Island & Pacific.—It is again reported that this company is arranging to build an extension of its road from Leavenworth, Kan., to Topeka. Propositions for local aid are to be submitted shortly to the counties on the line.

Chicago, St. Paul, Minneapolis & Omaha.—This company has just completed an extension of the North Wisconsin Division from last year's terminus, 12½ miles south of Chandler, Wis., north to Cable, 52½ miles. The new terminus is 120 miles from the junction with the Eastern Division, and is but 58 miles from Bayfield, on Lake Superior. The company intends to lay the track to Bayfield next year. The 52½ miles built this season are entirely through the pine forest, with no settlements except those which have sprung up on the road advanced. For 30 miles the line is along the Nemadji River, crossing the river frequently, and requiring much bridging and some heavy work.

Colorado Pacific.—This company has filed articles of incorporation in Colorado. The proposed line runs from Pueblo to Silver Cliff, over the route surveyed by the proposed Pueblo & Silver Cliff road; thence through Music Pass to Saguache, where a branch will leave it, running to the south to a point near Del Norte, and hence from Antelope Park to Silverton. The main line will be extended from Saguache to the Tomichi and to the coal fields, through the Los Pinos country to the Utah line, where it will strike Salina, running from there to Salt Lake City; thence it will follow the Colorado River a distance, and finally strike off for the Pacific Coast and San Francisco. Ouray and Lake City will also be taken in by branches.

Columbia River & Puget Sound.—The Oregon Railway & Navigation Company, which recently bought the Seattle & Walla Walla road, has organized a new company by this name to hold and operate the existing road and to extend it through the Snoqualmie Pass to Walla Walla; also to build branches from the terminus of the present road to the Cedar River and Carbon River mines. The capital stock is to be \$750,000. It is said that surveys for the extension of the road will be made at once, and work begun in the spring.

Denver & Rio Grande.—The allotments of the new stock and bonds to subscribers will be made exclusively to stockholders, who will receive them in about the proportion of 10 shares of stock and \$1,000 bonds for each 40 shares of their present holdings. At the issue price—\$1,650 for \$1,000 stock and \$1,000 bonds—the company will receive \$6,600,000, which will, it is estimated, be sufficient to complete all the new extensions now in hand.

East Line & Red River.—Track is reported laid to Greenville, Tex., 36 miles beyond the old terminus at Sulphur Springs, and 129 miles west of Jefferson. Trains will be running to the new terminus.

Frankfort, Georgetown & Paris.—This company has let a conditional contract for the construction of about 100 miles of its road from Frankfort, Ky., west to Paris, and thence into the coal region of Eastern Kentucky.

George's Creek & Cumberland.—The Maryland Court of Appeals has finally affirmed the title of the Pennsylvania Railroad in Maryland, under whose charter this road expects to reach the Chesapeake & Ohio Canal, to its line into Cumberland, Md., and to the land on which its depot in that city is built. The decision also affirms the right of the company to extend its line to the Chesapeake & Ohio Canal.

Grand Southern.—Tracklaying on this road is now finished, and only some ballasting remains to be done. The stations established on the new road, with the distances from the starting point at St. John, N. B., are: Junction, 1.9 miles; Spruce Lake, 7.6; Lancaster, 16.8; Lepreux, 24.3; New River, 29.5; Penfield, 36.1; St. George, 47.5; Bonny River, 53.3; Dyers, 62.1; Oak Bay, 77.3; St. Stephen, 82.1 miles.

Indianapolis & St. Louis.—It is announced that all arrangements have been completed by which this road will, after Jan. 1, be worked under the same management as the Cleveland, Columbus, Cincinnati & Indianapolis. That company owns a share in the road, and the change will make a saving in the expense of management possible. It will be known as the St. Louis Division of the "Bee Line."

International & Great Northern.—It is now reported that a controlling interest in the stock of this company has been actually sold and transferred to Jay Gould. It is said, however, that no change in management will be made at present.

Jefferson City, Lebanon & Southwestern.—A dispatch from Jefferson City, Mo., Dec. 15, says: "Arrangements were concluded to-day between Jay Gould and the stockholders of the Jefferson City, Lebanon & Southwestern Railway Company, whereby Mr. Gould acquires all the rights and franchises of said road, which includes 18 miles of graded road-bed and the right of way through the county, and in addition \$20,000 in bonds of the city of Jefferson, \$7,000 in bonds of Cole County, the round-house and contiguous property, and \$15,000 in cash private subscriptions. The entire stock of the road has been assigned to Mr. Gould. The bonds are in escrow, to be delivered when the road is completed to a point 40 miles from this city."

"Mr. Gould's agreement is to construct and equip 40 miles of railroad from this place in a westerly direction before Jan. 1, 1882, and to complete 20 miles of the same before July 1, 1881. The contracts were signed to-day by A. A. Talmage on the part of Mr. Gould, and J. M. Clark, President, and S. W. Cox, Secretary of the Jefferson City, Lebanon & Southwestern Railroad. The County Court made the necessary orders, and the City Council passed the required ordinances to give validity to the contract. The construction of the road will be commenced immediately."

Lake Erie & St. Louis.—This company has filed articles of incorporation in Indiana to build a railroad from a point in Jay County, west by south across the state to the Illinois line in Vermillion County. This is the company which is to build the St. Louis line of the Lake Erie & Western.

Lake Erie & Western.—The bridge at Fremont, O., which, with the trestle approaches, is 4,800 feet long, is completed, connecting the old line with the track of the Sandusky Extension. Tracklaying is now progressing rapidly on the Sandusky Extension, and a large part of it will be done this year.

Long Valley.—Track is now reported laid on this road from the Barclay Railroad at Lamoka, Pa., northward to the Long Valley coal mines. The road is seven miles long and has on it near the mines an inclined plane, 1,500 feet long and rising 500 feet, which is worked by stationary engines. The road is owned by the Long Valley Coal Company, and has been built to carry that company's coal.

Louisville & Nashville.—Contracts have been let for the extension of the Knoxville Branch from Livingston, Ky., to London, 18 miles. Much of the grading was done several years ago, but it is said to be in a somewhat ruinous condition. The work includes four tunnels, which have been partly excavated.

The Nashville American says: "On Jan. 1, 1881, the following changes in management and divisions of the Louisville & Nashville road will occur: The Mobile & Montgomery Division will terminate at Pensacola Junction, instead of Mobile, as heretofore, and be added to the Pensacola Railroad, making the 69 miles of the Mobile & Montgomery Division part of Mr. W. D. Chipley's line, and known as the Pensacola & Mobile Division. The Selma Branch and extension of the Pensacola & Selma Railroad, heretofore managed by W. D. Chipley, will be added to the divisions controlled by Superintendent B. Dunham, who will control the line from Decatur to Pensacola Junction, Montgomery to Selma, and Selma to Pineapple; also, the extension now building from Pensacola Junction, 30 miles distant. A round-house and car-shops will be erected at Pensacola Junction, and general improvements made on Pensacola & Mobile Division, among which the entire track will be of steel rails, the materials for which are now lying at Pensacola."

Lowville & Harrisville.—It is proposed to build a railroad from Lowville, N. Y., on the Utica & Black River road, west to Harrisville, about eight miles. A survey is now being made.

Memphis, Paducah & Northern.—Under the foreclosure suit lately begun the United States Circuit Court has granted an order for a receiver, appointing H. W. Smithers, President of the company, to that position. Mr. Smithers represents the interests of the Holland bondholders, who are the largest owners of the property.

Mexican Railroads.—El Noticioso of Nov. 29 says: "The work of track-laying on the Central continues with great activity. The construction train reached Guatilan on Thursday afternoon last, and every effort is being made to reach Huehuetoca by the middle of December."

"The raya list of last week, as shown to us, records 4,364 men under the actual employ of the company; 530 are located at Buenavista; 610 at the end of the track; 3,448 at Huehuetoca; 874 at El Salto, aside from a number of engineers and bosses not upon the raya list. The raya of last week amounted to \$13,769. Does this look as if the Central were diminishing their forces?"

"The Sullivan Company are pushing their work; 3,000 men are now under their employ, and as fast as supplies are received this number will be increased. A goodly number of engineers have been arriving and are all ready located at various points on the road."

"Kilometer No. 18 has been completed on the railroad of the state of Hidalgo."

Midland, of New Jersey.—This company's station in Paterson is on the eastern edge of the city and some distance from the business portion of the place, putting it at a considerable disadvantage for Peterson business. It is now stated that the company has quietly secured the right of way for a spur about 1½ miles long from its present station to a point close to the Erie station. This branch will probably be built next spring.

Nashville, Chattanooga & St. Louis.—This company reports earnings for November as follows:

Gross earnings	\$182,087.15
Expenses	163,779.82
Net earnings	\$18,307.33

Included in expenses are \$51,032.43 for 12 miles new steel rails on the Northwestern Division, extras and labor, and \$4,401.57 for new cars. Not including these extraordinary expenses, which in previous years were charged to construction, the net earnings would be \$73,741.33; interest on bonded debt and taxes were \$39,460.33, showing a surplus, on this basis, of \$34,281, or a deficit of \$21,153, if all expenses are included.

Northern Pacific.—Work on tracklaying on the extension westward has been suspended on account of the weather, and can hardly be resumed before spring. The grading will be continued all winter at all points where it is possible.

Oil City & Ridgway.—This road has been sold to Mr. T. H. Wilson, Superintendent of the Pittsburgh, Titusville & Buffalo road, and the purchase is understood to be for account of that company. The property includes a railroad from Oil City to Cranberry Mines, six miles, with a tract of 800 acres of coal lands. The company has a special charter, which is said to confer some valuable privileges.

Philadelphia & Erie.—The new issue of \$5,000,000 general mortgage 5 per cent. bonds has been negotiated with Drexel & Co., of Philadelphia. The proceeds of these bonds are to be used to pay off first mortgage bonds maturing in 1881. When those bonds are retired, the second mortgage will be a first lien upon the property, subject only to \$978,000 bonds of the old Sunbury & Erie Company secured on forty miles of the road.

ond mortgage will be a first lien upon the property, subject only to \$978,000 bonds of the old Sunbury & Erie Company secured on forty miles of the road.

Pennsylvania.—This company's statement for November shows for all lines east of Pittsburgh and Erie, as compared with November, 1879:

An increase in gross earnings of (14.1 per cent.)	\$442,918
An increase in expenses of (22.1 per cent.)	\$95,289
Net increase (3.5 per cent.)	\$47,627

For the eleven months ending Nov. 30, as compared with the corresponding period in 1879, the same lines show:

An increase in gross earnings of (21.0 per cent.)	\$6,545,891
An increase in expenses of (20.4 per cent.)	3,762,603
Net increase (21.0 per cent.)	\$2,783,288

All lines west of Pittsburgh and Erie for the eleven months of 1880 show a surplus over liabilities of \$2,883,471, being a gain of \$1,801,193 over the corresponding period of last year.

Philadelphia & Reading.—A meeting of holders of Schuylkill Navigation securities was held in Philadelphia, Dec. 20, to see what measures could be taken to enforce the payment of rental due from the Reading. It was resolved that a demand be made upon the Receivers, and, if they refuse to pay, that steps be taken to put the case before the United States Circuit Court. Messrs. Passmore Williamson, Charles Rhoads and Charles F. Ruff were appointed a committee to confer with the Receivers.

Pittsburgh, Titusville & Buffalo.—Agreements of consolidation have been concluded with three companies, and are shortly to be submitted to the stockholders for approval. The three companies are the Titusville & Oil City, which lately completed a new line nine miles long between those cities; the Buffalo, Pittsburgh & Western, which purposes building a line from Brocton, N. Y., to Buffalo, about 50 miles; and the Salamanca, Bradford & Allegheny River, which has lately been organized to build from Irvineton, Pa., to Salamanca, N. Y., 50 miles, with a branch to Bradford, about 30 miles. If these proposed extensions are completed, the company will have a line from Oil City to Salamanca, 100 miles; a line from Oil City to Buffalo, 140 miles, with 54 miles of branches, making 294 miles in all.

Under the consolidation, if carried out, the company will issue in all \$1,500,000 preferred stock, \$8,650,000 common stock and \$7,500,000 general mortgage bonds. Of the proposed issue of bonds \$4,000,000 are to be reserved to retire outstanding issues; \$2,500,000 used for new construction, and \$1,000,000 reserved for future wants. The stock, supposing the extensions built, will be \$34,524 per mile, and the bonds, \$25,510 per mile.

Portage & Baraboo.—This company has filed articles of incorporation in Wisconsin to build a railroad from Portage west by south, to Baraboo on the Chicago & Northwestern, about 18 miles. The stock is to be \$250,000, and the incorporators are chiefly residents of Portage.

Richmond & Allegheny.—This company has resolved to begin work at once on the North River Branch, from Buchanan, Va., to Lexington. A final survey and location of the route is to be made at once.

The track on the Western end is now laid to Buchanan, Va., the terminus of the canal, which is 30 miles from the junction with the Chesapeake & Ohio at Williamson. This section between Williamson and Buchanan is all new work; east of Buchanan the James River & Kanawha Canal is used as a road-bed.

Rochester & State Line.—The committee lately appointed has completed a plan of reorganization, to which bondholders may become part at any time before the date of the sale. The securities of the new company will be distributed as follows: Holders of the first mortgage bonds of the old company will receive new first-mortgage bonds to the amount of one-half of the par value of the old bonds and of one coupon in addition, and income bonds equal to three-fourths of the par value of the same bonds and one coupon in addition; they will have the option of taking new stock at the rate of five shares of stock to each \$1,000 bond, upon payment of \$50 for each five shares; holders of the debenture bonds of the old company will receive income bonds at par for the full amount of their holdings. The capital stock of the new company will be \$2,500,000. It is contemplated to extend the road from Rochester to Lake Ontario, and to provide funds for the cost of this extension by the issue of first-mortgage bonds at the rate of \$12,000 a mile and income bonds at the rate of \$16,000 a mile. These bonds are to be equal with those of the same class placed on the present road, but are to be a first lien on the road to be constructed. The name proposed for the new company is the Lake Ontario, Rochester & Pittsburgh Railroad Company.

Notice is given that all bondholders who wish to join in the re-organization must deposit their bonds with the Union Trust Company in New York, and sign the bondholders agreement on or before Jan. 8 next.

St. Louis & Indiana.—This company has filed articles of incorporation to build a railroad from East St. Louis, Ill., northwest to the Indiana state line near Danville. The distance is about 180 miles, and through a country already pretty thickly covered by railroads.

Scioto Valley.—Tracklaying has been begun on the extension of this road from Portsmouth, O., up the Ohio River to Ironton, 30 miles.

Shenandoah Valley.—A preliminary survey has been made of the line from Waynesboro, Va., to South River, on the Richmond & Allegheny's North River Branch. This section is to be put under contract shortly.

Southern Maryland.—This company has been reorganized, and has, it is said, completed arrangements to resume work on the road. The section which will be first built is from Brandywine, Md., on the Pope's Creek line of the Baltimore & Potomac, southeast to St. Mary and thence to Point Lookout at the mouth of the Potomac. The distance is 58 miles, of which about 45 miles were graded several years ago. A branch about five miles long, to Drum Point at the mouth of the Patuxent, will also be built. As soon as this section is finished the company will begin work on an extension from Brandywine to the Baltimore & Ohio's Washington Branch, and then to some point on the Chesapeake & Ohio Canal, the object being to make a coal shipping port at St. Mary.

Southern Pacific.—This road has been opened to Deming, N. M., 12 miles east of the last point reported, and 562 miles from Yuma. Only 45 miles remain to reach El Paso. A regular stage connection is now made with the Atchison, Topeka & Santa Fe at San Marcial, 75 miles from Deming.

Tehuantepec.—The New York Supreme Court has given its decision on the motion to continue the injunction in the case of Reid and others against Edward Learned, David S. Babcock and others. The plaintiffs allege that Learned, Babcock and Edward A. Quintard entered into an agreement with plaintiffs and others by which Learned, Babcock and Quintard became trustees for a syndicate composed of all the contracting parties, agreeing to hold the stock of the

Tehuantepec Railway Company for the benefit of the syndicate in certain definite proportions, to renew and organize the company, to obtain an extension of its grant from the Mexican government and to carry out, for the benefit of the syndicate, the scheme of the Tehuantepec Railway. It is asserted that Mr. Learned, who was made President of the company and Chairman of the trustees, caused his agents who went to Mexico to have his own name inserted in the grant and thence conveyed it, without the concurrence of the beneficiaries, to a new corporation formed under the laws of Massachusetts, called the Tehuantepec Intercontinental Railroad Company. The suit is brought to restrain the transfer.

Tehuantepec Ship Railroad.—*El Noticioso*, of the city of Mexico, in its number of Nov. 29, was largely devoted to this project, and to Captain Eads, who had recently arrived, accompanied by Messrs. George B. Griffin, Alex. G. Cochran, J. J. Williams, and E. L. Corbell, to interest the government in the ship railroad project. Mr. Griffin was recently engineer of the United States of Colombia and the state of Antioquia, and serves as interpreter of the party. This number of *El Noticioso* has a report of a long interview with Captain Eads, in thoroughly American style. Captain Eads said that, if the Mexican Congress granted the concession, he could obtain the necessary capital to construct the road without the least delay.

Texas, Santa Fe & Northern.—This company has been organized to build a narrow-gauge railroad from the Gulf of Mexico at Corpus Christi, Tex., by way of the Pecos River to Santa Fe, N. M., and thence by the Chama and San Juan valleys to Salt Lake, Utah, a pretty extensive project. Its first work will be to build about 25 miles of road, from Santa Fe to a connection with the New Mexico Division of the Denver & Rio Grande.

Toledo, Delphos & Burlington.—Track is now laid to Greentown, Howard County, Ind., 15 miles west of the terminus at Marion. The contractors are making extraordinary efforts to reach Kokomo by Jan. 1, in order to secure the subsidy of \$24,000 voted by that town. The weather has been very unfavorable, but work is progressing steadily.

Wabash, St. Louis & Pacific.—This company gives notice that on and after Jan. 1, 1881, the following rules will be adopted governing stop-over privileges on this line: A passenger holding a first-class unlimited ticket will be permitted to stop off once only on the lines east of the Mississippi River, for which purpose a stop-over check, good for fifteen days, will be issued. No stop-over checks will be issued at any point west of the Missouri River. Parties wishing to stop on the way must buy to the station at which they desire to stop, and re-buy from that point. No stop-over checks given on limited tickets of any kind.

Western & Atlantic.—The *Atlanta Constitution* says: "There has been a good deal said about the state road lease and a certain suit brought by shareholders within the past few days. The whole difficulty on which the suit is based is a simple one, and is this: During the past year or two there has been very active trading in the shares of the lease. Under a demand, stimulated by the heavy earnings of the road and by the desire of various persons to have a voice in the management of the road, the shares have gone up until as much as \$50,000 per share has been paid for several. A short time since it was discovered that Gov. Brown held that under the lease law, the original lessees and only them, their heirs or assigns, could have a voice in the management of the road. He based the opinion on the law and equity, claiming that as the law would not allow the original lessees to transfer their responsibility with the sale of the shares, equity required that they should control the road even after the shares were sold.

"As we understand it, it was to test the soundness of this ruling of Gov. Brown's that the issue was made. Mr. Charles H. Phinizy, Mr. Leonard Phinizy, Mr. N. L. Hutchins, Maj. James B. Cummings, and we believe Mr. C. I. Brown, signed a paper asking Col. Morrill, Secretary, to call a meeting. He declined, replying that they were not authorized to ask that a meeting be called, as they were not the original lessees. Thereupon the split started in the bitter spirit that some of the papers affected to believe, and we believe that it will be stopped as soon as the question as to whether the new shareholders can vote in the board has been settled or is fairly understood. That there is any disposition to make a fight on Gov. Brown, or on the policy of the road under his management, we do not believe.

"It is a strange thing, but most of the original lessees still hold a fraction of the share with which they started in. Gov. Brown holds a half share, Col. Cole a half share, Mr. Walters and the four gentlemen who are in the Walters interest hold each of them an eighth of a share, and so on nearly through the original list. We learn that Senator Hill, who was an original lessee, said that after looking into the law he is satisfied not only of his right to attend the meetings and vote his share, which he sold long since, but his duty to do so. At the end of the lease the state, regardless of all sales or transfers, will call upon the original lessees, or their heirs, for a settlement, and these original lessees will have to respond. This is a most wise provision, for otherwise the lessees could have ruined the property, then sold their shares to irresponsible men, and left them to settle with the state."

Western North Carolina.—Grading is now well advanced on nearly 20 miles of the Paint Rock line beyond Asheville, N. C. The bridges over the Swannanoa and French Broad are nearly finished, and a large number of convicts are at work. On the Southwestern or Ducktown Branch grading is also progressing, though with a smaller force.

West Virginia Railroad Projects.—Several new certificates of incorporation have lately been filed in West Virginia, as follows:

The Big Sandy & Great Southern Company, capital \$1,000,000, office at Charleston, W. Va. The line is from Charleston to some point on the Atlantic, Mississippi & Ohio.

The Buckhannon & Weston, capital \$250,000. Line from Weston in Lewis County, east by south to Buckhannon, 20 miles.

The Keyser & Pendleton, capital \$2,000,000. Line from the Baltimore & Ohio at Keyser through Hampshire, Grant and Hardy counties to Pendleton County.

The New Martinsville, Middlebourne & Pennsboro, capital \$100,000. Line from Pennsboro, on the Baltimore & Ohio, north to Martinsville, about 30 miles.

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Lake Shore & Michigan Southern.

This company makes the following statements for the year 1880, the earnings and expenses for December being partly estimated.

The earnings and expenses, etc., were as follows:

1880.	1879.	Inc. or Dec.	P. c.
Gross earnings..... \$18,720,000	\$15,271,492	I. \$3,448,508	22.3
Expenses..... 10,410,000	8,934,524	I. 1,475,476	16.5
Net earnings..... \$8,310,000	\$6,336,968	I. \$1,973,032	31.1
Interest, rentals, dividend on guaranteed stock..... 2,750,000	2,754,938	D. 4,938	0.2
Surplus..... \$5,560,000	\$3,571,980	I. \$1,988,044	55.0
Per cent. of exps..... 55.61	58.50	D. 2.89	

This surplus was equivalent to 11.24 per cent. on the stock; in 1879 it was 7.24 per cent.

The balance has been appropriated as follows:

Surplus, as above..... \$5,560,000
Sinking fund payment..... \$250,000
Dividends, 8 per cent..... 3,957,320
4,207,320

Balance..... \$1,352,680

The second dividend of 4 per cent. has just been declared. The board has decided to make it the last half-yearly dividend, intending to declare them quarterly hereafter.

The company has charged nothing to construction or equipment accounts since 1878. The operating expenses include the cost of 1,500 new freight cars, or \$700,000, and also the cost of 7,000 tons of steel rails, or several new iron bridges, new station houses, etc. If the cost of the new freight cars is excluded, the operating expenses (including taxes) were only 51.87 per cent.

Michigan Central.

This company makes the following statement for the year 1880, the December earnings being estimated.

The earnings for the year were as follows:

1880.	1879.	Inc. or Dec.	P. c.
Gross earnings..... \$9,100,000	\$7,345,700	I. \$1,754,300	23.9
Expenses..... 5,730,000	4,624,600	I. 1,105,400	23.9
Net earnings..... \$3,370,000	\$2,721,100	I. \$648,900	23.9
Interest and rentals..... 1,005,000	1,020,000	D. 15,000	0.9
Surplus..... \$1,765,000	\$1,101,100	I. \$663,900	60.3
Per cent. of exps..... 62.97	62.96	I. 0.01	

The surplus was equivalent to 9.42 per cent. on the stock, against 5.87 per cent. in 1879.

The application of net earnings was as follows:

Surplus, as above..... \$1,765,000
Construction..... \$100,000
Jackson accident..... 70,000
Dividends, 8 per cent..... 1,495,000
1,665,000

Surplus..... \$95,000

In the construction account there has been charged \$45,000 for land and \$55,000 for 6½ miles of additional second track. The payment on the Jackson accident settles all claims on that account. In the operating expenses were included the cost of 850 new freight cars (\$400,000); and also the cost of 4,700 tons of steel rails, of new iron bridges (\$45,000) and of new buildings and additions to old ones (\$43,000).

The second dividend of 4 per cent. has just been declared.

After this the dividends will be declared quarterly instead of half-yearly.

Canada Southern.

The following statement is published by this company for the year 1880, December earnings partly estimated.

The earnings for the year were as follows:

1880.	1879.	Inc. or Dec.	P. c.
Gross earnings..... \$3,717,278	\$2,995,345	I. \$721,933	24.1
Expenses..... 2,363,052	2,448,090	D. 85,038	2.2
Net earnings..... \$1,354,226	\$547,275	I. \$776,951	142.0
Other receipts..... 12,033	3,480	I. 8,553	274.6
Total..... \$1,337,261	\$550,755	I. \$786,506	142.8
Interest on bonds..... 420,000	391,453	I. 28,547	7.3
Surplus..... \$917,261	\$159,302	I. \$757,959	475.8
Per cent. of expenses..... 64.38	81.73	D. 17.35	

The surplus is equivalent to 6.12 per cent. on the stock, against 1.06 per cent. last year.

The surplus has been appropriated as follows:

Surplus..... \$917,261
New sidings..... \$38,870
New buildings and bridges..... 45,102
New water stations, etc..... 20,895
New tools and shop machinery..... 14,986
Land at St. Thomas, Toledo, etc..... 24,106
Settlement of old claims..... 45,713
Reduction of floating debt, chiefly for new equipment..... 315,256
Dividend of 2½ per cent., just declared..... 375,000
\$79,928

Balance..... \$37,331

The report states that the road and property have been maintained in good and efficient condition during the year. The renewals of track alone have been 173,860 ties, equal to 65.80 miles laid, and 650 tons of steel rails laid, at a cost of \$139,000. In addition to the ordinary maintenance and repairs, the following items were included in the operating expenses: Rebuilding old ferry boat, \$50,000; new passenger and baggage cars, \$18,000; and renewing passenger and freight equipment, \$65,000. By the ownership of the 1,100 additional freight cars, purchased in 1879, the expense of car mileage to this company has been reduced about \$127,000. After payment of operating expenses, interest on bonds, and a dividend of 2½ per cent. on the capital stock, there will remain to the credit of income account a balance of about \$423,000, representing assets mainly in the shape of material and supplies on hand, including about 3,000 tons of steel rails, fully paid for. The above mentioned expenditures for construction and equipment, and for renewals and repairs, have very materially bettered the condition of the property, and were necessary to enable the company to successfully handle its largely growing business. The effect is seen in the actual decrease in operating expenses, as well as in the increase of gross earnings.

New York Central & Hudson River.

This company presents the following brief statement of its operations for the fiscal year ending Sept. 30, in advance of the full annual report, which will appear a few days later:

The earnings, etc., were as follows:

1879-80.	1878-79.	Increase.	P. c.
Passengers..... \$6,011,159.51	\$5,953,101.94	\$58,057.57	11.1
Freight..... 22,199,963.94	18,270,250.38	3,929,713.56	21.5
Miscellaneous..... 4,304,787.78	4,173,231.23	131,556.55	4.6
Total..... \$33,175,911.23	\$28,396,583.60	\$4,779,327.63	16.8
Expenses..... 17,849,804.38	16,123,072.83	1,726,731.55	10.7
Net earn..... \$15,326,106.85	\$12,273,510.77	\$3,052,596.08	24.9
Gross earn..... 33,175.90	28,396.56	4,779.34	16.8
Net earnings..... 15,326.00	12,273.50	3,052.50	24.9
Per cent. of expenses..... 33.80	56.77		

The payments from net earnings were as follows:

1879-80.	1878-79.	Increase.
Net earnings..... \$15,326,106.85	\$12,273,510.77	\$3,052,596.08
Interest and rentals..... 4,743,158.50	4,679,024.81	60,133.69
State tax on earnings (one month)..... 11,640.84		11,640.84
Total charges..... \$4,756,799.34	\$4,679,024.81	\$77,774.53
Net profit..... \$10,569,219.51	\$7,594,485.96	\$2,974,733.55
Dividends, 8 per cent..... 7,141,512.95	7,130,528.00	1,984.95
Surplus..... \$3,427,706.56	\$454,957.96	\$2,972,748.60

The net profits were equivalent to 11.82 per cent. on the stock, against 8.49 per cent. in 1878-79.

Included in operating expenses is the cost of 6,355 tons of steel rails.

There have been expended from the surplus for construction during the year the following sums:

Grading for new tracks, Buffalo and East Buffalo..... \$35,925.87
New bridges..... 52,342.89
Superstructure for new tracks, Buffalo and East Buffalo, and new sidings..... 73,093.45
Depot, freight-house and yard improvements, Buffalo, East Buffalo and 65th street, New York..... 314,946.59
Additional locomotives (37)..... 252,050.00
New cars (2,000)..... 1,497,165.50
Land bought at Buffalo, Syracuse and 65th street, New York city..... 1,085,915.08
Total..... \$3,281,439.38

The average receipts and expenses per train-mile and per unit of traffic were as follows:

1879-80.	1878-79.	Inc. or Dec.	P. c.
Earnings per train mile, freight..... \$1.92	\$1.52	I. \$0.40	26.3
Expenses per train mile, freight..... 1.18	1.05	I. 0.13	12.4
Profit per train mile, freight..... 0.74	0.47	I. 0.27	57.5
Earnings per train mile, passenger..... 1.30	1.23	I. 0.07	5.7
Expenses per train mile, passenger..... 0.82	0.72	I. 0.10	13.9
Profit per train mile, passenger..... 0.48	0.51	D. 0.03	5.9
Earnings per ton mile, freight..... 0.87 ct.	0.78 ct.	I. 0.09 ct.	11.5
Expenses per ton mile, freight..... 0.54 "	0.54 "		
Profit per ton mile, freight..... 0.33 "	0.24 "	I. 0.09 "	37.5
Earnings per passenger mile..... 1.99 "	2.05 "	D. 0.06 "	2.9
Expenses per passenger mile..... 1.28 "	1.20 "	I. 0.08 "	6.0
Profit per passenger mile..... 0.73 "	0.85 "	D. 0.12 "	14.1

The average train load was